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MAGAZINE

Airborne

NUMBER 98

March-April 1990

AUSTRALIA: **\$3.90**
NEW ZEALAND: **\$5.85**

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ELECTRIC FLIGHT
THERMALCHARGER

HIROBO

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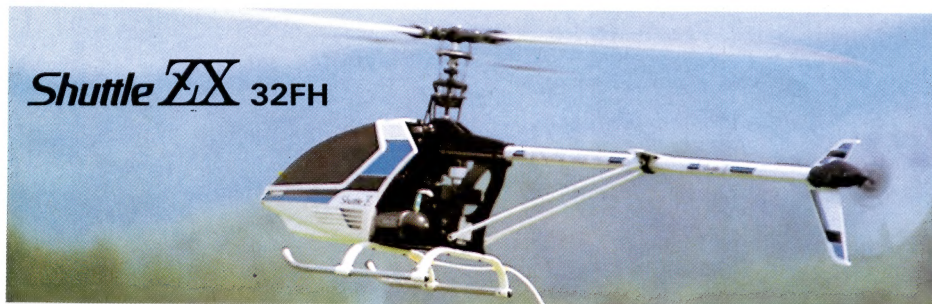
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Counter Gear	Hirobo-STD	EX-type	EX-type
Wash-out	Hirobo-STD	EX-type	EX-type
Fuel tank	Hirobo-STD (420cc)	Large size (500cc)	Large size (500cc)
Main frame-B	Hirobo-STD	Large tank special	Large tank special
Body	Hirobo-STD	Black shark made by local hobby shop	Hirobo-STD
Tail gear	Hirobo-STD	TSK tail gear box	EX-type



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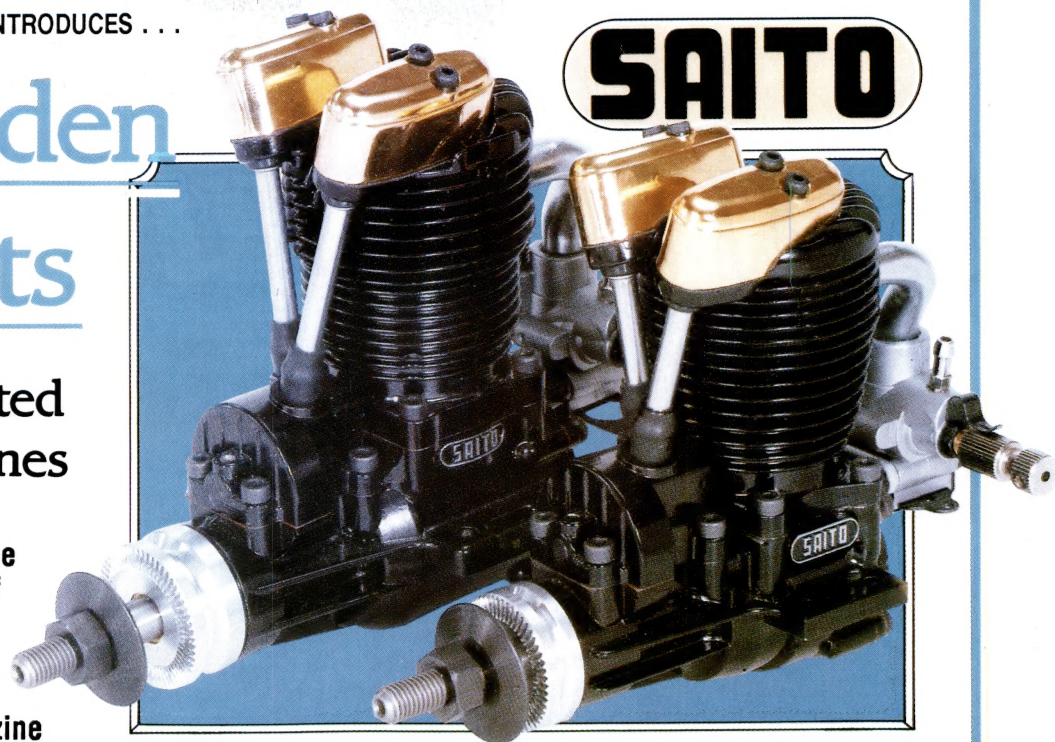
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The latest addition to the Golden Knight Family of FA-50 GK and FA-80 GK is the FA-65 GK. See our advertisement elsewhere in this magazine for introductory special price.



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FA-80G	13.1	27	22.8	2,000~11,500	540	11½ x8~11x10	M7x1	ABC	1.3

AVAILABLE FROM THE HOBBY HEADQUARTERS

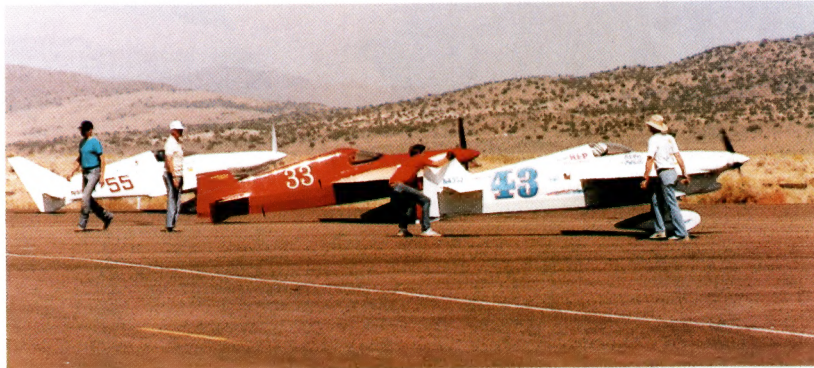
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Electric power is within reach of everyone with the Thermal Charger, reviewed in this issue; or with the MiniDrake from AIRBORNE plans. Nick Siefken shows the two designs for comparison. Photo by Phil Stevenson.

Formula 1 racers at Reno '89. Helper struggles with No. 43 as the pilot checks the throttle response. These are the Half A equivalent of full sized pylon racing. Our contests are just as much a sport as this business!

Colin Borthwick is a Modern Timer as well as an Old Timer, and reviews the Scorpio Fiesta in this issue.



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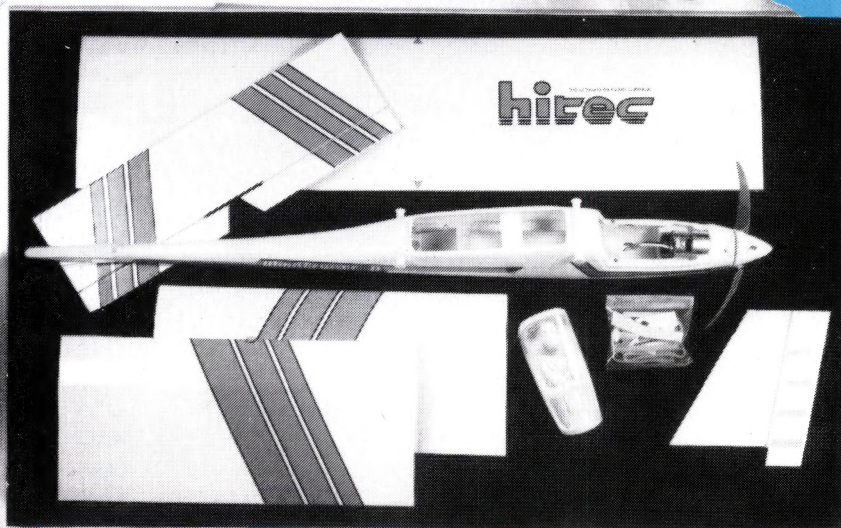
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- Fully constructed with streamlined Blow Moulded fuselage
- Ready built wing and tailplane covered with PROFILM
- Includes motor, spinner and folding propeller
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- Fuselage length 890 M.M.
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Airborne

MAGAZINE

NUMBER 98

March - April 1990

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(Inc. G.S.T.)

ISSN 1030 0090

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Original material should be double or triple spaced with a wide left hand margin. Photographs may be colour or black and white prints. Diagrams should be inked on tracing paper. Photos will be returned only if a stamped, self-addressed envelope is supplied. Material should be sent to:

The Editor, RMB 1798, Benalla, Vic., 3673.

Payment must be negotiated with the General Manager.

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COVER STORY Sporting a beefy Saito 5 cylinder radial engine is this 1933 Kinner Sportster, built by Joe Matthews from the Greensborough MAC (Vic). Size, like the model, is impressive with a 117 inch wing span. Weight is 25 pounds (11.3kg) and the Saito swings a 20"x8" prop. Covering is 'Coverite' oversprayed with BP enamel. Instrument panel is nicely detailed and well finished.

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MIDWEST RC AEROPLANE KITS

SUPER HOTS

KIT #157

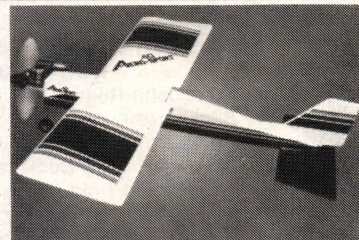
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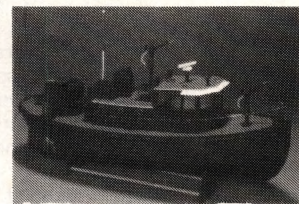
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KIT #161

A first class sport model designed for the modeller who has built and flown an Aero-Star and is ready for a plane with more aerobatic capabilities. The Aero-Sport has the strength to take hi-g aerobatics and rough landings. A wide speed range takes you from screaming low inverted passes to near hovering capabilities, with take-offs and landings that will impress. Wingspan 52 1/4 inch, Wing Area 594 sq. inch, Flying Weight 5 1/2-6 lbs, Channels 4, 2 Cycle Engine. 30-.40, 4 Cycle Engine .45-.61.



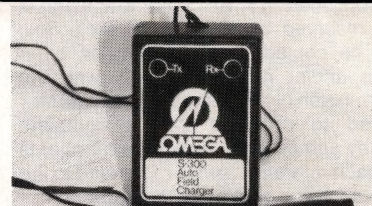
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FEATURES: The Omega Mk II Field Charger will automatically charge both Tx (8 cell) Ni-Cad battery packs from any 12 Volt field battery or auto battery. Mk II Field Charger is suitable for use with the conventional fast charge type Ni-Cad batteries with capacities from 100 to 1200mA without adjustment. The charge facilities may be used individually or simultaneously, with complete supervision of each battery. The Mk II Charger incorporates several safety features, which include: reverse polarity protection should the 12 Volt battery connection be accidentally reversed; and a temperature compensated automatic voltage cut off which constantly monitors the batteries and reduces the charging current to a safe level as they approach the fully charged state.



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- SUITABLE FOR 450, 500, 550 & 600 MA CELLS
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MODIFIED CORRECTION

In No. 95 I proposed that the term motor segler, which comes from the German term for glider, be used to replace the incorrect term, powered glider, that has crept into our hobby. The proposal was nothing more than a side step from the real issue, but a solution has come through our Electric Flight columnist, from someone whom I have regarded as the best writer AIRBORNE has had. Here is the story

BILL'S DEFINITION

From Phil Stevenson

Long time readers of Airborne will remember that the On Silent Wings column was begun by Bill Tinker. Bill is now retired to the country and also has a need to get his models airborne without outside help. His first letter was like many I receive, asking for some advice, and, being an ex-columnist, he naturally knew to send an SAE. I sent off a copy of our AEFS Newcomer Special which, although produced in 1986, is still relevant, available, and may soon be updated. Some of his second letter is worth printing here.

"Many thanks for your reply to my query, and for the beginners booklet enclosed. I'm flattered by your avid perusal of my contributions to Airborne. I only hope that you gained something useful from me; fair's fair! Whether that's so or not, you may recall that on a couple of occasions I jostled with Jack Black over the adoption of the term electric glider, or powered glider. I noticed that in your booklet the terminology is still there!! Oh dear! Call me a fusspot; accuse me of pedantics; but I don't see why a language should be abused so! I have a suggestion; perhaps it will fill a small gap in your column.

I've scoured many dictionaries, each time with the same result: a powered glider is a terminological impossibility. Even the Macquarie defines a glider as a **motorless aircraft**. Ergo, once you install a power plant, be it rubber, I.C. or electric, any aircraft ceases to be a glider. However, if you delve into the definition of soarer, the prime characteristic allied to the airborne object is "a gain of height". Whether or not it houses a motor of any kind is irrelevant in the use of the term. I recall reading an account by a Swordfish pilot who hit a standing wave over the Pennines in northern England. The old Stringbag **soared!** In fact, he had a devil of a time finding his way out of the lift zone without going through the draught further on. Therefore I suggest that the term "powered glider" be replaced by the accurate and more acceptable (to me, at any rate!) term of **Powered or Electric Soarer**. This has even more enhanced connotations of the high aspect ratio machine it is used to describe, without being the total contradiction that is the popular terminology currently in use.

..... but then who in hell listens to me?"

Well, perhaps we should listen. You will note that so far I have not succumbed to using the unmentionable term. However, I have just received my latest updates to the MAAA Rules Book (even sent off my \$8 to Chris), and I see that even the FAI define our World Championship class as 'Electric Powered Motor Gliders'. Also, the newly-included event for 'Seven Cell Electric Glider' must offend Bill. On that account I apologise, because I submitted the draft.

Perhaps it's time we accepted the language as it is used. I work in an office with lots of modern electronic equipment used to store, process and retrieve data. They do no computations but we still call them computers. Then there is that classic of terminological impossibil-

From the Cockpit



Another excellent club house, this one at Bundaberg. Just something the club members threw together after a long search for a long-term flying field. Roving reporter is Arthur Gorrie who is inside at the bar, having a chat with the locals.

ity, that of 'Military Intelligence'; but those in uniform may disagree. Or how about 'Political Honesty'?

This contradictory terminology has been named an aximoron by Jake in Model Builder magazine.

ANALYSIS ALMOST COMPLETE

In the space of a couple of issues, Martin Simons' Flight Analysis will end. Martin has submitted the final chapter of what must surely be the most comprehensive, most coherent discussion of a subject in any modelling journal. The series will be completed with a list of the chapters of Flight Analysis, with the date of publication. This will help modellers for future reference.

Over the years Flight Analysis has stimulated much discussion and several questions. The completion of the series is a suitable time to provide an opportunity for readers to ask questions, to which Martin may be willing to reply. Such questions, comments and observations may be sent to 13 Loch Street, Stepney, SA, 5069. The cut-off date for them will be 15 May 1990.

MINIATURES AVAILABLE

Modellers appreciate aircraft quality, which is generally accepted to be above automotive and domestic quality. Bob Stone of 47 Wallara Cres., Bundoora, Vic., 3083, has available small ball bearings and micro switches of aeronautical quality. The items are shown in the photograph. There is also a roller bearing 28 mm OD and 12 mm ID that is not illustrated. They are available for \$2 each, and since even a good order

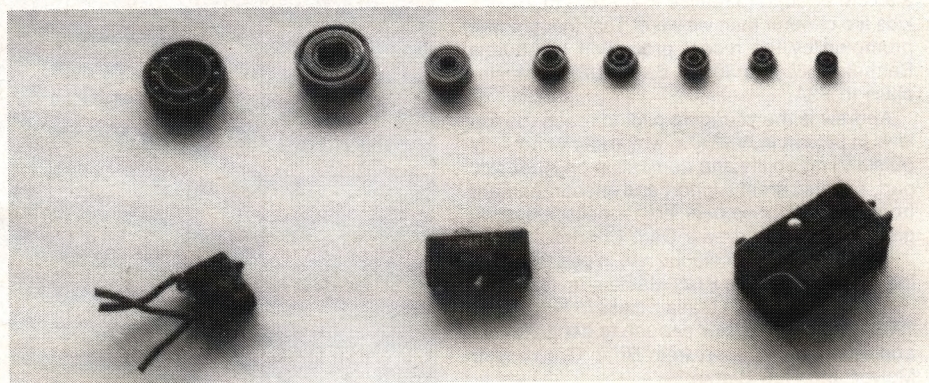
would not weigh much, Bob has stipulated only \$1 more for packaging and postage.

IVOR'S 30th NATS

Make that Ivor's 30th consecutive Nats! Our venerable VH1 attended the Bunbury National Championships, held during the first week of the New Year, bringing up that amazing score for Nats attendance. He also scored very well in the competitions, being placed first in P30, first in FF Seaplane, second in CL Seaplane and third in A2 glider and the Day Scramble. If that's what retirement can do for a man, who else has earned such rejuvenation, as Ivor has? Congratulations, Ivor! and to all those who attended the Nats in the far west.

TISSUE TESTED

It is quite some time since coloured wrapping tissue, that seemed to be suitable for models, appeared in Target stores and stationers. I used some of this tissue recently and found that it was very good material. It has one side shinier than the other, and appears to be of random grain; rag style of composition. It softens and stretches greatly when wet, but retains enough strength to enable wrinkles to be pulled out, then shrinks very well. Two good coats of dope seem to seal the tissue properly, and also bring out a good sheen. The weight seems to be about the same as white tissue currently available, and the colours are fast. However, it is expensive.



Ball race bearings and micro switches available from Bob Stone. High quality; dozens of modelling applications.

FROM THE COCKPIT

TRANS TASMAN SPECIAL

A replica of Southern Cross, the plane in which Charles Kingsford Smith made the first flight across the Tasman in 1928, will be flown from Australia to tour New Zealand in March and April this year. The plane will fly to most major provincial centres, where it will be on display to the public to raise funds for the N.Z. Crippled Children Society. The visit is sponsored by the ANZ Banking Group, as part of the celebration of its 150th birthday in New Zealand.

The organisers of the visit are keen to hear from New Zealanders who met Kingsford Smith in 1928. They should contact ANZ Publicity, Box 1492, Wellington, New Zealand.

NOT NICE

We are sorry for the comments about Queensland in FOCUS in No. 96. One reader wrote in to say that all states deserve similar denigration, but pointed out that such political comments about any state do not belong in this magazine. We agree. We shall try to avoid lowering our standards in this way in future, and keep to modelling. If and when we stray, please let us know. We deserve your help to that extent, at least.

KRAFT MASTERS 1990

Venue: Wangaratta Air World

Dates: Wednesday 18th April

Registration - Thursday 19th April

Competition - Friday 20th to Sunday 22nd April

Headquarters: Garden View Motel (057) 21 9166

10% discount will be given to anyone booking four or more nights. The discount applies to the fourth and subsequent nights only.

Further information: Charles Banhelyi

(03) 890 0718 [BH] or (03) 725 3720 [AH]

NEWCASTLE CRAFT & GEM SHOW

This is a first-time expo for the Australian Fossickers' Club Inc, and will be conducted on the Queen's Birthday weekend in June at the Newcastle Exhibition Centre, not far from Broadmeadow railway station. There will be many crafts and some hobbies on display, as well as the gemstone collections. Exhibiting or selling or swapping may be done from stalls inside a pavilion. Further participation is invited, and clubs that wish to join in this event should contact Marianne Enwright at 21 Gimberts Road, Morriset, NSW, 2264, or by phone on (049) 73 3836.

CONGRATULATIONS.

I have always been pleased to report successes by junior modellers in Australia. Some of us have been modelling long enough to realise that some of the things we did were pretty clever, and also old enough to realise that some of today's kids are cleverer than we were! That thought was prompted by the recent promotion of Andrew Banhelyi (16) and Jason Bruce (18) to Master class in F3A.

Andrew is the youngest pilot to reach the top level in pattern in Australia, which shows not only outstanding ability and dedication on Andrew's part, but also great support and encouragement from other APA members, both aspects reflecting great credit to Andrew's Dad, Charles.

Jason has had a meteoric rise in pattern, starting in earnest at the Kraft Masters in 1987, and rising from Expert to Master class in November 1989. Jason was clever enough to get technical and emotional support from Brian Green, Cliff McIvor and Rob Clarke.

Credit is also due to Eddie Lo for sponsoring the Kraft Masters, which was started by the late



The replica of Smithy's Old Bus over Bankstown, round about ABAS time, October '88. The aircraft will cross the Tasman to participate in New Zealand's Sesqui Centenary. This photo by Graham Ferguson.

Barry Angus many years ago. The APA story is one of the great chapters of MAAA history. Any modeller should be proud to belong.

HURRICANE CONTEST

The timing of this event coincides with the 50th anniversary of the Battle of Britain, and the generous prize money should encourage enough entries to make a Wing of Hurricanes! Duxford was a Hurricane base during the Battle of Britain and there are a couple of them being restored there at present. Modellers wishing to enter the competition should write for an entry form and conditions to David Boddington, c/o ASP, Argus House, Boundary Way, Hemel Hempstead, Herts HP2 7ST. They should please include an International Postal Reply Coupon.

LION OF AN ENGINE

The Leo 28 reviewed in No 97 has now done almost ten hours running, flying a 2 metre span high winger around the sky with a 10 x 4 nylon propeller. Its behaviour has been top notch. It starts consistently with one or two flicks, unless there is a blockage in the spray bar; runs up to top revs immediately and holds till the fuel runs out. By replacing the throttle with a straight venturi having a .95mm bore, performance has been increased to over 13,000 rpm on the 10 x 4, and fuel economy remains at about 10 ml per minute. This is outstanding, and is equivalent in some respects to that of the early 6.5 cc plain bearing engines. With the Leo 28 the makers have got it right, including the name.

WHEN IS A TEST NOT A TEST?

And this has nothing to do with cricket!

The manager and I have been reminded that engine rpm figures, sometimes quoted to compare engine performances (and perhaps used to make one engine appear better than others) should not be regarded as giving a true comparison. The reason is that the rpm figures depend upon the engine, the gloplug, the fuel, the weather and the propeller: they all vary. The degree to which the engine is leaned out to its peak is also important. As an example, I took a 6.5 cc engine, a fresh batch of fuel and a handful of 10 x 6 props and ran some rpm figures. I simply ran up to top rpm, recorded the reading, punched the fuel line to stop the engine, changed the prop and repeated the procedure. It all took only 20 minutes. The temperature changed by about 1° during that time. I'll give the names of the props to give you something else to think about, but the name of the engine and fuel composition don't matter.

MAP GRN	12,000
Topflite wood	11,400
Bolly GRE	11,800
Taipan GRN	12,000
Freedom GRE	11,100
Tornado 3-blade nylon (10 x 4)	11,100
MAP GRN (repeat)	11,800

Note the measurable difference with the MAP between the start and finish of the tests. Enough said!



The retracts that would not! Problem solving by Rod Bailey at rear, Brian Williamson, Brian McFarlane, Brian Green, Bob Romano, Tom Bloodworth and David McFarlane, at Wollongong, September last year. Bob seems to be giving the others the drill!

WHAT'S THE NEWS, MATE?

That should be 'What's the Mate news?' when discussing David Owen's Mate diesel engine. As has been advertised, kits of the pieces of metal, together with excellent scale drawings and precise instructions, are now available from Delta Miniature Engines. Apart from the few model engine builders among the thousands of our ranks, the Mate project could be the most challenging model a modeller could tackle, after a series of flying models, but could also be the start of a more precise style of model-making that is full of surprises and pleasure.

THAT HURRICANE CONTEST

The date has been changed to Sunday 12 August to avoid clashing with the Old Warden Scale Day. Some entries have been received already. For more details watch for announcements in the MAP magazines from England.

SHUSH!

Noise control adviser to RCAS, Stuart Sherlock, has designed a very effective muffler for 6 to 10 cc engines, that may be used as an after muffler or as a primary muffler with a suitable manifold. It weighs 50 gram and is available now. Ring Stuart on (02) 607 3307 for more details.



NATS RESULTS

RADIO CONTROL

F4C - FAI Scale (11)	
Neil Giggins	2979
Joe Di Giorgio	2935
Greg McLure	2933

Mammoth Scale (7)

Joe Di Giorgio	2796
Victor Longbon	2781
Ian Clapp	2748

F3E - Electric (6)

Hans Sommerauer	1220
Peter Pine	1138
Mike Farren	1070

Seven Cell Electric (11)

John Torrance	607
Peter Pine	599
Mark Ferguson	586

Old Timer Duration (18)

John Bannerman	1832
Paul Baartz	1776
Gary Turna	1775

Old Timer Texaco (20)

Geoff Potter	2480
Bernie Barrett	2480
Gary Turna	2480

Old Timer 2 cc

1. Geoff Potter	
2. Roy Jury	
3. Steve White	

F3B - FAI Glider (11)

Peter Lewis	14437
Don Woodward	14306
Eddy Meester	10930

Thermal Glider - Snr (20)

Peter Pine	4697
Peter Lewis	4681
John Haren	4565

Thermal Glider - Jnr (3)

Kevin Pierpoint	4582
Todd McGuffin	4273
Brock Beale	3514

F3A - Aerobatics (5)

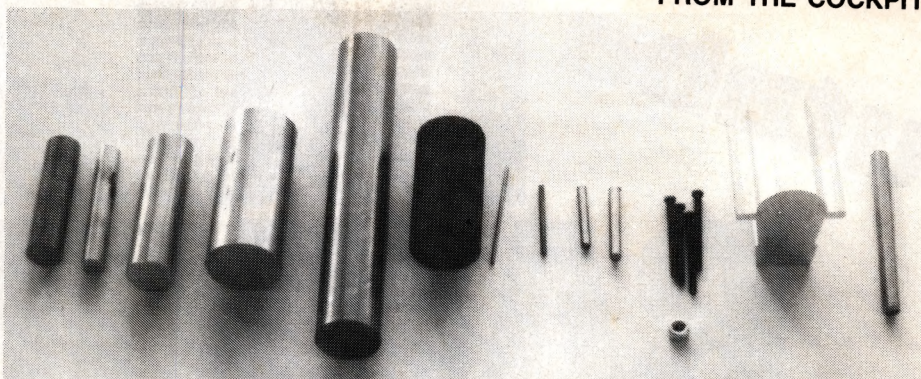
Stephen Coram	Masters	3000
Jim Harrison	Expert	2897
Gary Lloyd	Expert	2611

Sportsman Aerobatics (9)

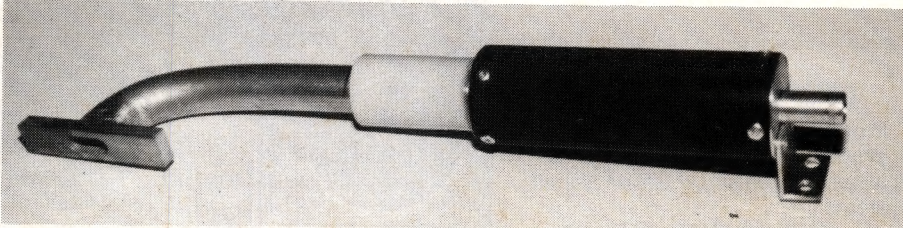
Neil Fraser	3000
Nicolai Handervitt-Harr	2705
Lucas Keogh	2532

Radio Control Champion: **Peter Pine**

FROM THE COCKPIT

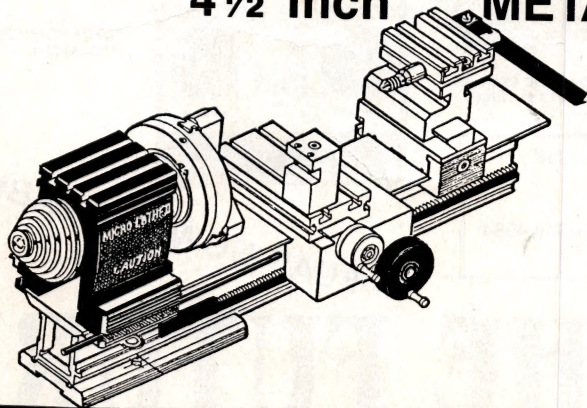


Metal supplied for personal production of the Mate diesel. L to R: phosphor-bronze crankshaft bush; aluminium con rod; aluminium venturi; prop driver and prop washer; al cooling fins and backplate; steel crankshaft and cylinder; cast iron piston and contra piston; silver steel needle; silver steel comp screw shank; cylinder head screws and prop nut; al crankcase extrusion; and brass spray bar and nut. If you can't see all these items in the photo, use your imagination, mate! If that's not enough, order a set from Delta Miniature Engines and get to work!



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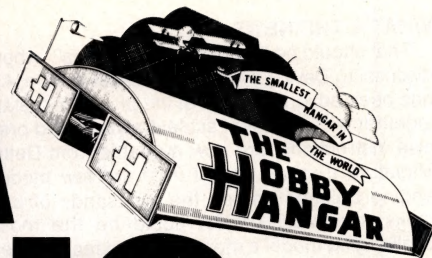
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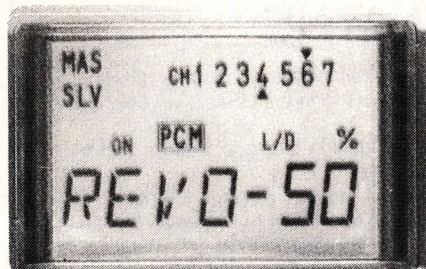
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SCREENING OUT ERRORS

In addition to programming functions, the big LCD screen also provides information for servo reversing, PCM/PPM switching, transmitter battery voltage and elapsed time of operation. Everything you need to know for a perfect flight is there, in easy to read numbers, at the touch of a button. Even a low battery warning signal is included.



Large LCD indicator screen monitors all programming functions.



7UAP PCM 1024 transmitter with trainer system and RF module.

ERGONOMIC ENGINEERING

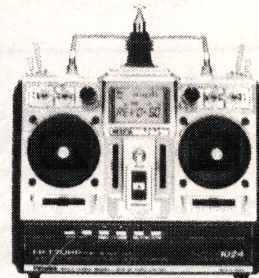
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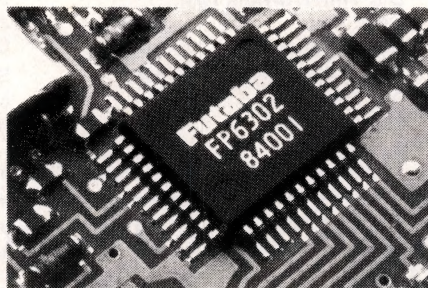
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7UHP PCM1024 Transmitter.

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FUTABA IS THE FUTURE

Dear Sir,

In answer to the query posed in the caption under the photo at the top left hand corner of page 4 in *Airborne* No. 96, I can say with certainty that it is Dale Brown's, with father Dave watching intently during the first few seconds of the flight. Some doubt existed as to whether the model was mine or Dale's, as both have the same colour scheme, down to the white wheel hubs. However, examination with a magnifying glass revealed a VH number with more than one digit on the wing and a black propeller. Mine has a single number 9 on the wing and a grey propeller. It just goes to show how hard it is to identify individual models from photographs!

Yours faithfully,

Basil Healy, Booker Bay, NSW.

Thanks Basil. Lovely photo.

Dear Sir,

We continue to appreciate *AIRBORNE*, and think you have a fine publication with lots of variety. In case you are in touch with Martin Simons, please tell him his *Flight Analysis* is one of my favourite sections of your magazine. And No. 43 was particularly impressive. In my own case, I have had experience with several of the hypothetical examples he gave, having flown a hand-launched glider from a moving balloon, an Escondido Mosquito in a Boeing 747 (dratted cabin pressurisation turbulence!) and flown models on the hangar-deck of an underway aircraft carrier (the USS Kearsarge). mmembers of our squadron also flew control line models on the flight deck while underway, a co-operative skipper arranging to steam with the wind so as to provide near-zero air across the deck. One example Martin might care to examine in his wonderful way is that of individual blades of an autogyro, which would seem similar to the control line case, except they are tethered to a platform which itself is moving through the air. They do, of course, rise and fall.

Yours faithfully,

Bill Hannan.

Hannan's Runway is now at Box 860, Magalia, California 95954, USA.

Dear Sir,

The floatplane fly-in conducted annually by Lithgow Aeromodelling Club is becoming more popular. The 1989 event had a very good attendance and good weather, although there was rain on the way up to the mountains.

The only prizes were for the most impressive model, won this year by Steve White with a North Star flown by Dave Brown, and for the biggest splash. Every pilot was entered in a lucky draw for modelling goodies, kindly provided by Karl Rowe Hobbies of Penrith.

Food and drink were available from a canteen run by Joan and Dianne Dowler and Nancy Daniels, and from a barbecue run by Pat Brain.

The club has special permission from the Greater Lithgow City Council to conduct this event, and due to the requests to make it a two day affair it is important to know if there is enough support to take the case to the Council and request an extension.

The excellent venue and organisation, and the upsurge in popularity of floatplanes, have been noted, and I would be most interested to hear readers' thoughts on any improvements we could make to the event. Please send your bouquets or brickbats to me at 35 Esplanade Avenue, Lithgow, NSW, 2790, or ring me on (063) 52 1074.

Yours faithfully,

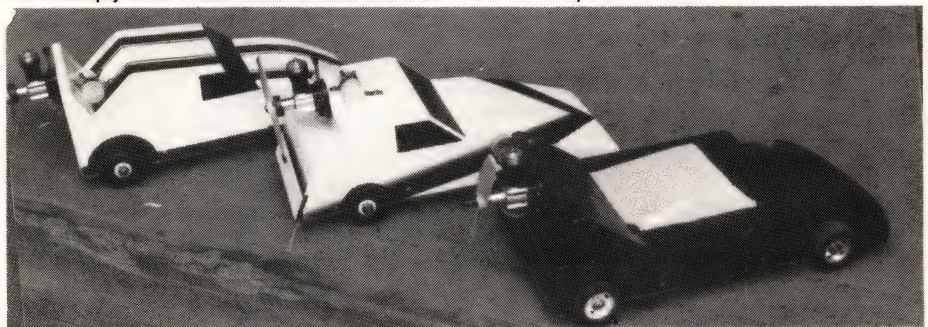
John Parnaby, Presdient L.A.C.

Modelling is for fun: satisfaction with safety.

Letters to the Editor



A class of junior modellers tutored by Nick Siefkin. The models are the Doonfly, designed by Ivor F. The motors are also used in air screw powered cars, designed by the class members, and made mostly of 3 mm plywood. These cars are shown below. Nick sent the photos.



Dear Sir,

As Keith Murray stated in his article in the last *'Duration Times'*, less emphasis should be placed on competition, and we should have more Fun Flies which would encourage more Old Timer flyers to attend, especially those who are not competition minded. This was evidenced at Werribee on 26 November last year, with some flyers travelling from as far as Ballarat, and Kilcunda in South Gippsland. I feel that we would not have seen these modellers if it had been a 'hot' competition day.

Don't get me wrong; I enjoy competition flying, especially at Canowindra and the Roy Robertson Trophy events, as proved by my attendances over the years (with a few trophies to prove it as well). However, I agree with Keith, and suggest that maybe everyone should once more read the SAM pre-amble. **That is what Old Timer flying is all about.**

The models presented at Werribee included Cardinal, Powerhouse, Playboy (3), Red Zephyr, Miss America, Super Quaker, Flamingo, Rikard Flying Wing, and a model similar to a Sunduster.

Engines were mainly four strokes, however, there were 2 stalwarts flying sparkies, namely an Ohlsson 60 Sideport, and an OS Type K6. A few antique engines were on static display. These

included mint condition Bantam 19, Ohlsson 23 Sideport, Dockyard 'Cub', 3.5 cc Dooling 29, K&B Torpedo .049 and K&B .060.

Finally, all credit must go to President, Jim Merrills, and the members of Werribee MAC for a perfect day; one which I'm sure will be remembered for a long time by all who attended. There should be more of them.

Graham McDonald, Frankston, Victoria.

Dear Sir,

I read with interest the American Report from Derek Buckmaster in *AIRBORNE* No. 96. Derek mentioned how he had found out the location of his nearest model flying club via photocopied information from his local hobby shop proprietor, and he wondered how many Australian model clubs do this.

While reading this paragraph I nodded my head re-assuringly, knowing that our club information forms have been on the counters of the local hobby shops for just on two years now. Over this period of time the club has increased its number of financial members by about thirty percent. I can't claim that these information forms are solely responsible for this increase, but I think that they have helped to tip the scales of new membership enrolments, out-numbering the

LETTERS TO THE EDITOR

natural wastage that occurs in every club where members fail to renew their membership.

My club, the Heathcote Soaring League, is fortunate to have its flying field away from suburbia, on the southern outskirts of the city, but draws its members from all over the southern area of Sydney. This area is well served with hobby shops, with eight retail outlets coming to mind on a quick count. Our club information forms are left in six of the closer shops to our flying field. Our photocopied sheets consist simply of a single A3 sheet folded in half with a brief club history and names and phone numbers of the club executive on the front cover. Inside the double sheet is a simple line map to locate our field, a list of the club rules, a safety check list to run through before launching a model and a tear-off membership application form.

I also hand this form to anyone who approaches me at the flying field, together with a list of the locations where the newcomer can have their radio gear MAAA bandwidth tested. This list of testing stations is simply photocopied from the RCAS newsletter.

I recommend this type of information form to every model club looking to increase its membership, whether you have one local hobby shop in your town or city or ten of them.

Yours faithfully,

Mike Combe, Secretary HSL

Other club secretaries, please note this PR technique.

SCALE SAILPLANES

Remember the special contest for scale sailplanes at Waikerie aerodrome on April 21 & 22. There are two classes: pre fibreglass (before 22.11.57) and post 27.11.57; and two contests: static and thermal duration; plus an overall, combined score trophy. This should be the biggest scale-glider event ever held in Australia.

Victorian Electric Rally

Venue: Snow Road, Oxley, near Wangaratta.
Date: 28 & 29 April 1990. Start 1000 hours.
Events: General Flying - anything goes.

- * 7-Cell Electric Soarer;
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- * Open Duration;
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- * 7-Cell Pylon.
- * Pylon race for RTF foam models.

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MISCHIEVOUS MIXTURES

by Len Williamson

In Airborne No. 97 the Engin-ear comments on the potential hazards of some of the chemical brews used by aeromodellers. His touch is light, but the message is serious. As an example of chemical cocktail he gives a fuel mixture. An elementary knowledge of chemistry might suggest that the materials quoted cannot produce anything new (or deadly). However, in clear glass vessels intermittently exposed to sunlight, all sorts of combinations can take place. Generally the quantities of new compound(s) will be small; almost minute; but a hazard can conceivably occur.

The remedy is to:

- * keep all mixtures in opaque containers; metal or polythene.
- * make only as much as is needed for your immediate use.

All this is speculative, but a very real hazard exists in exposure to the vapour of mixtures of some solvents, since the toxicity can be much increased. The text book example is MEK (methyl ethyl ketone) which intensifies the neurotoxic action of the hydrocarbon hexane. It is for this reason that I classified MEK as having neurotoxic action in Airborne No. 93. This is not strictly true, but the risk of a mixture with a hydrocarbon like hexane is not beyond the bounds of possibility with the exotic mixtures handled by enterprising aeromodellers.

If we consider the solvents given by the engin-ear, the short term exposure limits are:

Fuel	Parts per million
Nitrobenzene	2
Nitromethane	150
Xylene	150
Methanol	250
Paraldehyde (approx)	100

Let us assume that all these materials affect the internal body organs in the same way, and that we have the following concentrations of vapour in the workplace:

Fuel	Parts per million
Nitrobenzene	0.5
Nitromethane	10.0
Xylene	50.0
Methanol	100.00
Paraldehyde	20.0

Note that each chemical is well inside the safety limit for short term exposure. However, using a formula given by Worksafe Australia for calculating the additive effects of mixtures, we find that the Engin-ear's mixture at the concentrations given above exceeds the recommended safety limit by 25%. Take care!

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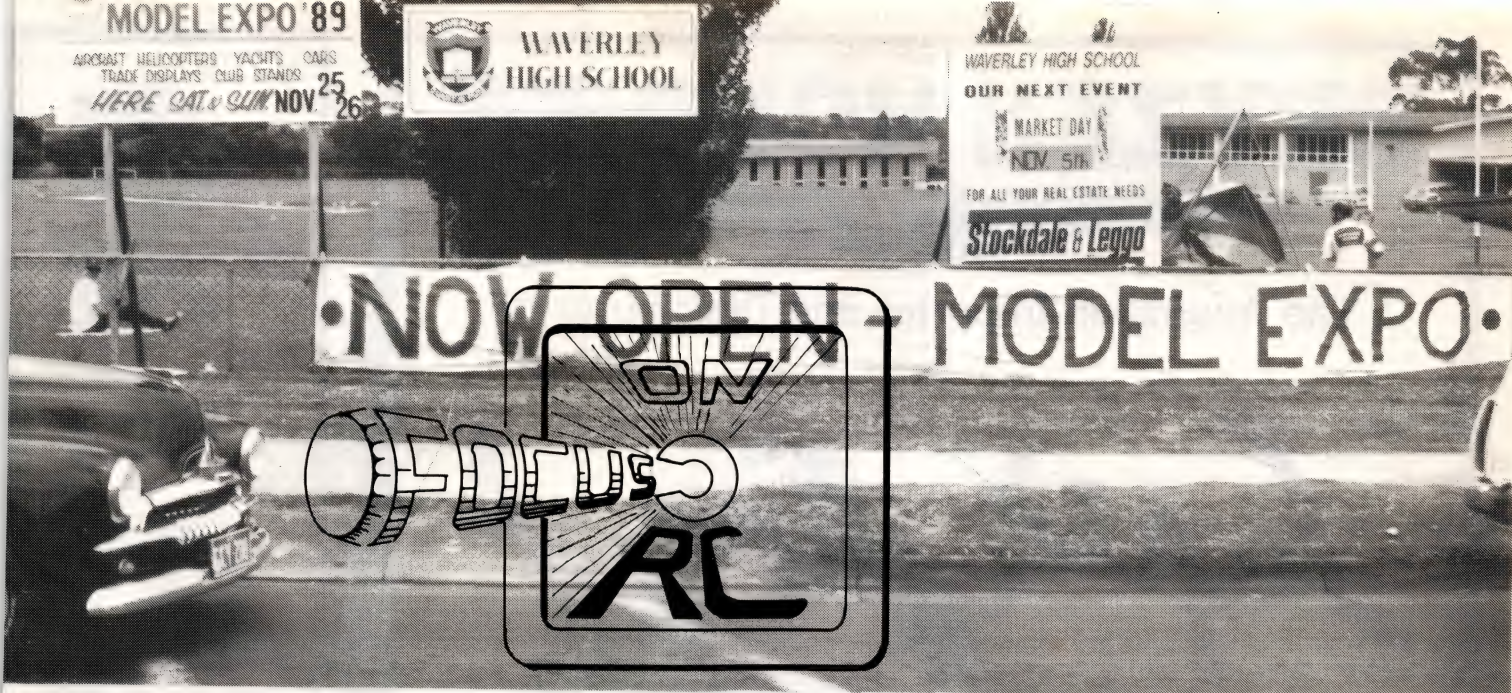
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THE YEAR THAT WAS

Life is change; modelling is change. And yet there has not been much change with FOCUS, in spite of a shift in my focus since taking on the editorship of *Dirt & Track*. Developments in this column have been gradual and not obtrusive due to the continual input of a wide range of top notch contributions from all over the country, even from Aussies visiting overseas places. My thanks to them once again for making my job as a columnist easier, and if the changes or the mixture of topics have not been to your liking, you can blame the Editor because he sees more of it than I do now.

Thanks Mel! The Blue Pencil cops it again! Actually, I enjoy it. The diversity and interest of the material is the best part of the job.

We have had plans and construction articles, items about safety, about repairing, about fun flying, about finishing. Articles for newcomers, engine reviews, radio reviews and kit reviews, so that it seems likely that the same mixture will be on offer again as we move into the 1990s.

Your comments, ideas and particularly pictures of your model AND YOU (with all the details) are always welcome here at **64 Beverley Avenue, Unanderra Heights, NSW, 2526**. Now, on with the fun. But keep it safe!

HEY HO! COME TO THE FAIR

from Neil McLeod

For the fourth year VARMS combined some of Melbourne's model clubs and hobby trade to present many facets of modelling to the public. Experience from previous years and good weather made the Expo a great success, much of it due to Jim Robertson, the VARMS PRO.

The Expo consisted of trade stands and club displays inside the Waverley High School, and flying and static displays outside on the school sports field. A plastics modelling group was included for the first time this year. Water borne models were included, and the Surrey Park MBC won the Best Club Exhibit. Big models included the VARMS tug and David Law's Stuka which won Best Model of Show.

Static displays included hang gliders, Keith Hearne's ultra light, Ryan Nothard's F2 racing car and a Cirrus sailplane. The flying demon-

strations included CL vintage team race and combat, Cliff McIvor flying CL and RC sports models, Scott Lennon flying a Ricochet and Rob Barbuto and John Wessell flying RC helicopters.

Important points for success included a good venue, advertising in regional newspapers, leaflets for schools and shop windows, displays in shopping centres and banners outside the venue to attract passing motorists. Also, awards for different categories of models should be available and advertised, including sponsorship from the hobby trade for door prizes and show awards.

A guide to show organisation is available by discussion with the VARMS executive.

PARTICIPANTS IN VARMS EXPO '89

The Clubs

Control Line Aircraft Modellers Society
Doncaster Aeromodellers Club

Venue for the fourth VARMS modelling show. School hall was just big enough for indoor displays, and school grounds were large enough for restricted flying demonstrations. That's 1989; not 1949 as might be suspected from car bonnet at left! McLeod photo.

Knox Model Aircraft Club
Lilydale & District Flying Association
Melbourne RC Helicopter Club
Pakenham & District Aeronautical Radio Control Society
Racing Model Power Boat Club
Surrey Park Model Model Club
Victorian Free Flight Society
Victorian Model Power Boat Club
Victorian Model Yachting Council
Waverley Scale Modelling Club

The Trade

Australian Balsa Company
Hawthorn Hobbies
Model Engines (Aust)
R J Model Enterprises
ABC Models
Micro Dee
Riverside Hobbies
Victorian Hobby Centre



The best trade stand at the 1989 VARMS Expo. A small exposition, but becoming more popular each year. This pic from Mike Christoph. Trade and club support is encouraged and awards are made where merited.

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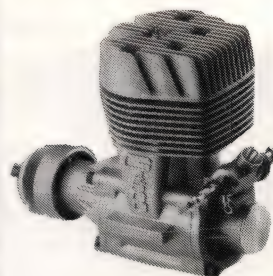
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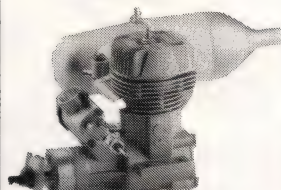
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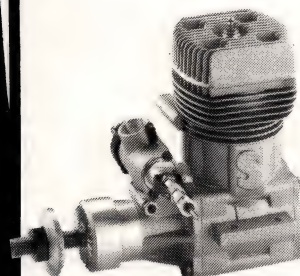
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S61K ABC FI RC
S75 Ring FI RC & Muffler
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S2000/25 FI RC
S3000 FI RC
S6000 In Line 60cc Twin
S29H ABC/R & Muffler
S45H ABC/R & Muffler
S61 ABC/R FI RC & Muffler
S90 ABC/R FI RC & Muffler
S21/25/29 TIGER'S PAW Muffler
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S61/75 TIGER'S PAW Muffler
S90 Tigers Paw Muffler
S61/75 Tuned Pipe

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USING THE RIGHT TULLE FOR THE JOB

From Mark Adams

"I'm home, honey, and I've got two tickets to the Aeromodellers' Ball," I called as I walked through the front door.

"I've got nothing to wear," came the reply. Why do women always say that?

"Why don't you buy a pattern and make something?"

"You know I can't follow a pattern."

"It can't be too hard. You've seen me make planes from plans."

"Yes, and look how long it takes. That plan you got last year for the Flutterby is still a pupa on your workshop shelf."

A few days later I came home to find the lounge-room floor littered with scraps of dress material, and my beloved at the ironing board.

"What are you doing?" I asked.

"Putting this lining into my new ballgown," she replied, pressing down with the iron onto some white fabric.

"What's the white stuff?"

"It's called tulle. It's got some sort of glue on one side and when you iron it onto the other material it stays on."

I picked up a scrap of the thin, white fabric. Its silky lightness impressed me, and I bolted for the workshop. Heating my covering iron, I pressed the fabric onto a bit of sheet balsa. It stuck; smooth and taut. The result was much better than my efforts with tissue and dope. The fabric sanded smooth and took a coat of paint. What a great covering material! It saves on dope, weight and the hip-pocket nerve. Readily available at the local dressmaker's shop for a couple of bucks per metre, it shows that you've got to use the right tool for the job.

FOAM MAY SAVE YOUR GEAR

from Alex Ovcharenko

We all go to all sorts of trouble to protect a delicate radio receiver from total destruction after a high speed arrival at altitude zero. I have seen installations where the radio was protected by a piece of light 5 mm plastic foam. This protection, of course, being the next best thing to useless. I have also seen neat boxes made of 5 mm rubber foam where the sides have been cut to size and glued, and the receiver slipped in. Not bad, but I have found an easier solution.

Armstrong Nylex manufacture black rubber foam tubing of 32 mm I.D. and 9 mm wall thickness (Type 0989); like the type used for car roof racks. Just cut a bit of tubing slightly longer than



Scott Lennon dodging his Hangar Rat, overhead, at the VARMS Expo '89. Not much room for flying! The late Keith Hearn's ultralight, which was once flown with Hi-Tec radio, is on stage, and models are everywhere. Model construction demonstrations were made during the weekend. Photo by Neil McLeod.

the inside width of the fuselage, slip your receiver into the tube and then slide the lot inside the fuselage. The receiver package will be a nice tight fit inside the fuselage. It won't slop around and it will be well protected. Don't forget to cut a slit in the foam tubing for the receiver wires.

.... AND ADD LIGHTNESS

The old free flight catch cry is the basis for development of better items for modelling. The new Sullivan wheels seem to be a neoprene coating over neoprene foam, molded to shape, according to Stu Richmond, and about 50% the weight of the traditional wheels. Dave Brown foam wheels are even lighter but do not have a sealed surface.

MORE ABOUT THE U.S.A. SCENE

It's not true that overseas interests are making a move on Airborne. Our homegrown entrepreneurs may be having a lean time at the moment, but Airborne always has been, and always will be (let's be positive), 100% Aussie. Why the out-

break of Nationalism? Well, two issues ago we seemed to be full of envy for the goings on in the good ole yewnitedstates, but as the Editor explained in his section up the front, it was just a triple coincidence.

With that excuse for an apology out of the way, you might be interested in the latest big time happening from across the pond. It appears that the AMA have finally bitten the bullet and invested \$3 million (yes, that's three million dollars US) in a permanent flying field somewhere in Indiana. This info comes via the grapevine, with Ford Lloyd being the final grape in the bunch. Ford wrote saying nice things about Airborne, so we just had to pass on his gossip. The area is one square mile, and they have an option on another square mile, which would be the area required for their grand plan. Ford enclosed a copy of the plan, which was drawn by a team of professionals. It includes separate areas for helicopters, soaring, pylon (surrounded by a 100 metre high by 440 mm thick solid acoustic brick wall - just joking guys!), as well as CL, six FF launch areas, camping, RC cars and boats, display buildings and a man-made pond. Wow! Fully developed cost would be about \$10 million. Apparently they had some problems with complaints from surrounding farmers, but these were pacified when offered grazing rights on the field. The AMA's experiences, and the success or otherwise of this bold move, may determine the long-term future of our sport, so it will be followed with great interest.

Ford also confirms how fortunate we are with our RC frequencies. Whilst he was judging at their Nats there was no flying on one afternoon due to massive interference, probably from a city paging system. He spent seven days straight, sometimes for twelve hours a day, judging pattern and pylon, and said that it was a lot of fun. This was not Ford's first trip of this nature, by a long shot, so he must qualify as one of our top modelling ambassadors. Thanks for the hot news, Ford.



Just a Dash of Pattern! Er ... 4 Dashes of Pattern? Machines of Tom Bloodworth (YS 60, YS 60), Andrew Banhelyi (YS 60) and Jason Bruce (OS 61 LS) at Lilydale, November '89. Charles Banhelyi doing a dash of photography.

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MIX-A-MATIC from Dave Brown Products is a two part, equal mix glue that has a cure time of two hours. When cured, Mix-A-Matic epoxy is extremely strong, fuel-proof and doesn't leave an oily film. Mix-A-Matic is easily sandable, which makes it ideal for structural building and making fillers (with Dave Brown Products MICRO-BALLOONS). Mix-A-Matic comes in a convenient 10 ounce size.

FAST-MATIC from Dave Brown Products is also a two part, equal mix glue that has a cure time of 5-8 minutes. It has the same great qualities of Mix-A-Matic and its faster cure speed makes it an ideal choice for making repairs out at the field.

Flick through any aeromodelling magazine and you will soon read of foam-cored wings, tailplanes and rudders, used in a variety of aircraft, from mass-produced ARTF types to scratch-built examples of the Master Modeller's art. The foam used is usually expanded polystyrene (EPS), a white material which looks as though it started life as a cheap picnic cooler. It is wonderful stuff for making wings, as it is light and can be cut with an electrically heated wire into aerofoil shapes. However, it lacks strength and the wing will fail if given a sharp blow, such as during a cartwheel landing.

EPS-cored wings need to be skinned, either with a veneer of balsa or with fibreglass, to strengthen them. This adds weight, but does not necessarily defeat the problem of compression failure. Veneering does not prevent warping or the bending of the wing under high aerodynamic loads.

There is another type of foam which is better suited to aeromodelling than EPS. It is called Blue Foam, logically, because it is coloured blue. It is extruded rigid polystyrene. It is available from larger hardware suppliers which deal with the building trade, or from industrial insulation suppliers. It is marketed under the name of **Panelmate (TM)**, and is supplied in sheets 2400 mm x 600 mm. The sheets are 25 mm thick. Greater thicknesses are marketed as **Cladmate (TM)**. A sheet of Panelmate (TM) costs about \$11.

Why is Blue Foam Better than EPS?

The advantage blue foam has over EPS is its strength. Blue foam has nearly three times the resistance to compression of EPS. This high resistance to compression reduces the chance of the surface to buckle. Blue foam also has about 2½ times the shear strength of EPS,

Blue Foam

by Mark Adams

preventing failure of the core at the point where a fracture is likely to occur. As a result of the shear strength, blue foam is more rigid than EPS, an important factor when a wing is subjected to high aerodynamic loads, such as during aerobatics.

What about Weight?

There has to be a bit of give and take in comparing these two foams. EPS is lighter, at 14 kg per cu. m., against blue foam's 32 kg per cu. m.. But what is the effect of this? Consider an untapered, semi-symmetrical wing with a chord of 23 cm and a span of 1.275 metres. The cross-sectional area of the aerofoil is approximately 0.005 square metres. The wing volume is 0.00625 cu. m.. An EPS core would weigh 87.5 gm (3 oz) while a blue foam core would weigh 200 gm (7 oz). However, the EPS core needs to be sheeted with balsa or fibreglass, while the blue foam core could be covered with paper. The final weight of the two wings would be close. Both wings would have the same wooden leading edge.

What's That about Paper?

By relying on the inherent strength of the blue foam, it is possible to cover the wing with paper. The paper used is stiff brown paper that is used for wrapping heavy parcels. It has a matt side and a shiny side, and is available from the local newsagent. The paper is glued to the surface, shiny side out. PVA glue is suitable, diluted 70% PVA to 30% water. Another method is to use wallpaper paste, available in powder form from hardware stores. Just mix as directed, apply to the paper, and smooth on. (Don't let the wife see you doing it or you will lose building time wallpapering the lounge-room!)

Getting Stuck-in

Apart from the differences in mechanical properties, EPS and blue foam react in virtually the same ways to adhesives. Epoxy glues give the strongest bonds. Aliphatic resins are also suitable. PVA glue is not suitable for joining in load sensitive areas, as the bond will break before the blue foam. There are some paste-like adhesives, such as Liquid Nails, but these have an inert carrier which just adds unnecessary weight. Cyano-acrylate adhesives are all right for spot jobs. It is always wise to check a glue on a scrap of foam before using it. If in doubt, try it out.

Painting and Protection

Oil-based paints will attack blue foam. There are two ways round this. One is to use water-based plastic paints. This is fine for aircraft for which the finish colour is decided by personal preference. However, when it comes to scale subjects, the only suitable colours may be oil-based. To use these the surface must first be sealed with an all-purpose water-based undercoat, then the oil-based paint can be applied. As with glues, try the paint on some scrap first. Areas likely to be affected by fuel should also be sealed with undercoat.

Tools for Working Blue Foam

One of the delights of blue foam is the simplicity of the tools required to work with it. A bow for use when making cuts with an electrically heated wire is essential. This is a home-made item, and there are plenty of published designs for it. Other tools are saws, knives and a variety of grades

of sandpaper. When cutting sheets for large pieces, a Dremmel-type saw with a fine blade will go through blue foam like a hot knife through butter. It will also produce a cut at right angles to the sheet face. To remove substantial amounts of foam, use a very coarse sandpaper. Mark the boundaries of the final shape and rip off the excess with the coarse paper to about a millimetre of the final shape. Finish off with a finer grade of paper such as 300 grit wet and dry.

Shaping Blue Foam

Blue foam is a very fine material, unlike EPS which is beady. Blue foam will sand to a very smooth surface without the risk of chunks coming away from the surface. It sands quickly and messily. There is some need for caution while sanding. The dust is very fine, like balsa dust. However, unlike balsa dust, it will not absorb water and soften. If it gets into the eyes it is a mechanical irritant. The only treatment is to irrigate the eye with running water to float the dust out. Care should also be taken to prevent the inhalation of the dust: wear a paper mask. The dust will settle in clothing, so close the eyes when removing jumpers and the like after working with blue foam. Sanding blue foam produces lots of mess. It is definitely not to be done on the kitchen table. Stay in the workshop, and brush your clothing off before entering the house.

What Else is it Good For?

Blue foam is a wonderful material for aeromodelling. It is strong, relatively light, easy to shape, cheap, and available. But are foam-cored wings all that can be made from it? Definitely not! You should be able to think of many other things that can be made from this wonderful material.

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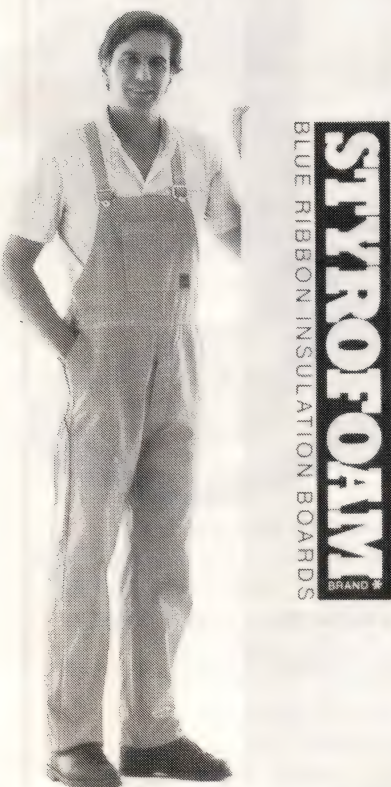
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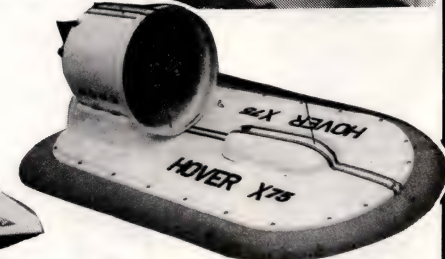
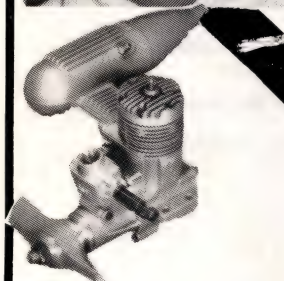
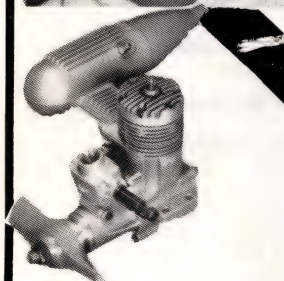
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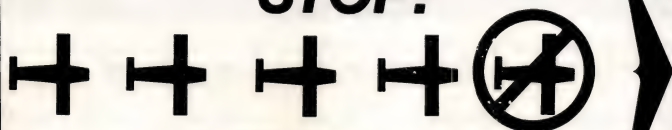
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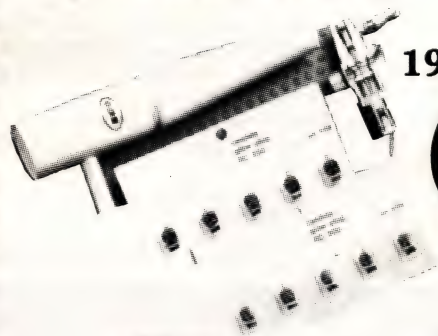


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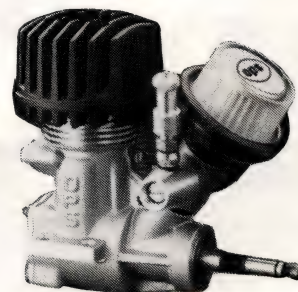
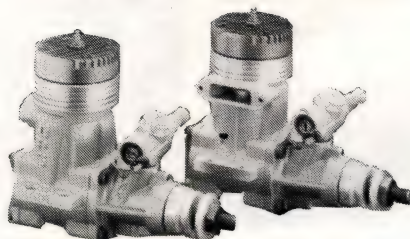
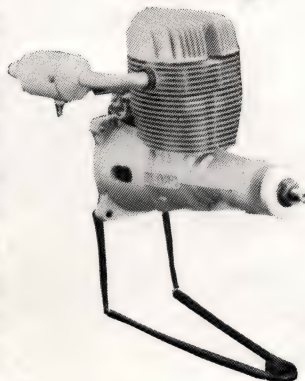
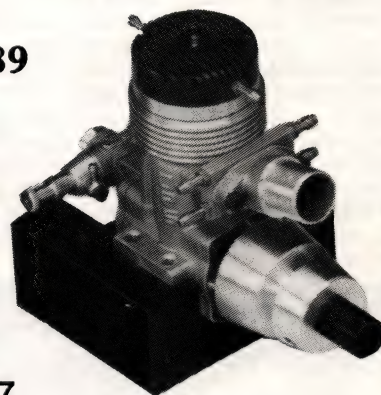
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RENO AIR RACES 1989

by Ron de Chastel

A sprawling suburbia is one side of Reno not often seen by tourists. A conglomerate of hotels, casinos, bars and eating houses is the other. But our attraction was the 26th Annual Aircraft Racing Championships held at the Reno Stead Airport, which is closed to all non-participating aircraft for the whole week of racing and air show activities. In actual fact, it is an Air Show first and Racing second as far as spectators go; and what a show!

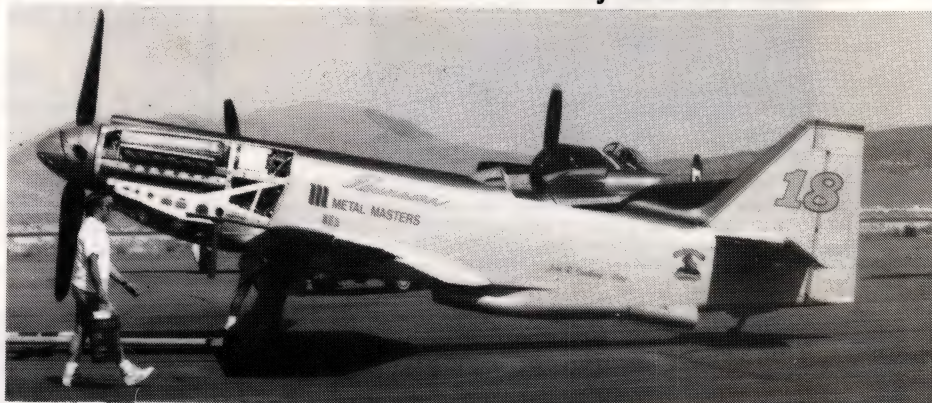
Firstly The Racing

Over 100 aircraft covering four categories (Formula 1, Biplane, AT-6 Texan and Unlimited) run through qualifying rounds to eliminate the slower flyers for the Bronze, Silver and Gold Heats and Finals, resulting in fairly close racing for a total purse of \$335,000.

Up to eight machines fly per heat with Formula 1 (100 HP motor and 500 lb minimum weight) and Biplane (180 HP motor and 500 lb minimum weight) flagged off for a racehorse start; while Texan and Unlimited form up in the air for a fast downhill flying start.

First impressions? They're crazy! Most of the course is flown at about 50 ft altitude, and to see a group of these machines rounding a pylon, virtually in formation, at this low altitude is frightening. In some instances machines would disappear from sight on the downhill side of the course, and in many cases the machine's shadow could be seen, seemingly only a few feet below, as the aircraft flew over the undulating surface. The speed and sound of the Unlimited Class is shattering. In one race a Lightning was rounding a pylon in a 90° bank, with a Mustang, Bearcat and Kittyhawk, wingtip to wingtip, all travelling around 400 mph, with the Lightning's wingtip only 15 to 20 feet above the ground!

The range and variety of Unlimited Class aircraft competing was amazing. From stock P51s to the highly modified Tsunami, Bearcats sitting nose high to clear the 16 ft paddle bladed propeller (necessary to absorb almost 3,500 HP from the modified motor), Sea Furys, some with standard motors and five-bladed props, others with highly modified motors turning the opposite direction. Much modified Russian Yak 11 fighters (very fast) and a very interesting home designed aircraft of low power that, nevertheless, qualified, and the magnificent Lockheed P38, one of only five still flying in the world today.



A different scale subject for pylon: the modified Mustang now called Tsunami (Japanese for tidal wave). Mods by Steve Hilton gave 470 mph at the Reno Races '89. Photo by Ron de Chastel.

From a modeller's point of view it was paradise to meander through the pits with the opportunity to photograph every conceivable detail. Friendly pit crew always seemed willing to talk and explain details of their machines, and pit atmosphere during racing was electric as the official lead aircraft guided eight racers to the start line at over 400 mph and announced by radio through the ground based PA system: "Gentlemen; we have a race."

The Formula 1 and Biplane Class were a lot slower (approximately 200 mph) and seemed very tame by comparison, as were the Texans, as speeds of most aircraft were similar. Nevertheless, some close racing resulted.

The event was marred by a disastrous and fatal crash of a Miller Special pusher machine, one of three competing. Inexplicably, the aircraft hit the ground rounding a pylon, disintegrating on impact. Cause unknown, but believed to be a victim of wake turbulence. Racing did not stop, and very little mention was made of the incident. This was the 8th fatality in ten meetings.

Race Winners:

- Unlimited Class - The mighty Rare Bear much modified Bearcat, flown by reigning champion, Lyle Shelton, at an average speed of 470 mph.
- AT6 Class - Tome Duelle in an NA Harvard Mk 2 named Tinkertoy; average speed 228 mph.
- Biplane - Bill Woods in a Boland Modified Mong Sport named Wanna Fly 2; av. speed 207 mph.

- Formula 1 - Ray Cote in Alley Cat, an Owl design; av. speed 235 mph.

The Air Show

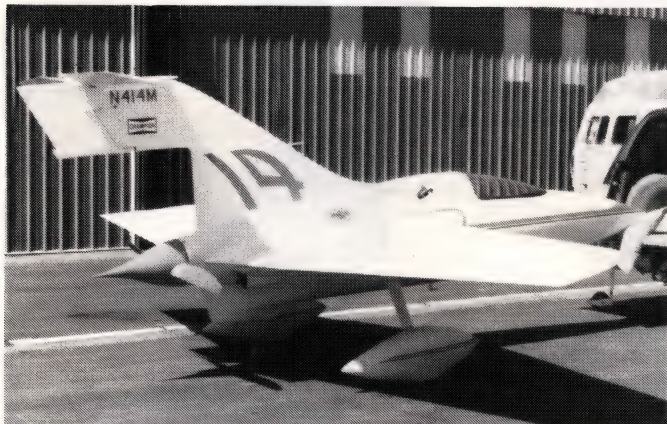
This was a startling experience. The mere fact that **all** the displays were performed down to ground level **and** close was a spectacle in itself. Then to watch a Pitts S1 do loops from and back under a 20 ft high streamer was breathtaking; but to watch the same machine fly knife edge and cut the streamer before rolling out and cutting another streamer at the same height was mind numbing.

The Christen Eagles aerobatic team, flying identical machines, just like Mel Gillott's 1/3 scale model, showed tremendous skill in formation aerobatics. Their close formation take-off, with smoke trails, followed almost immediately by simultaneous snap rolls, showed flying skill of the highest order. I saw them! Eat your heart out, Mel!

Military displays and fly pasts by F16, Phantom, Hercules (with parachutists) U2 Spyplane and Harrier added to spectator interest. The Herc. even flew the 9 mile pylon course!

The Team America flew a series of graceful close formation displays in their distinctive blue Siai Marchetti F260s.

Patty Wagstaff, in her souped up Extra 230, a much modified Laser design, flew some very precise and crisp solo manoeuvres, including her own 'corkscrew roll'. Flown at about 50 ft altitude,



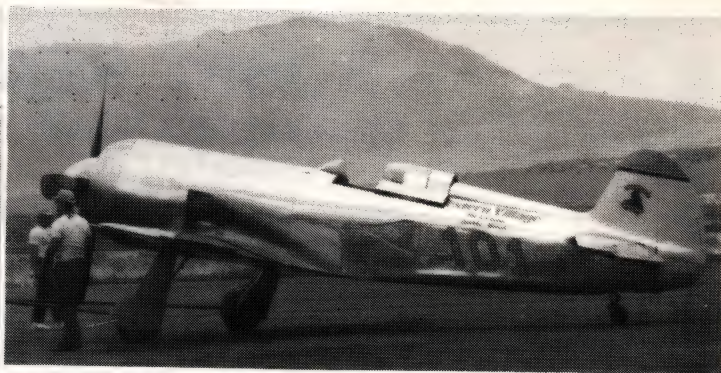
The Pushycat, a Miller Special JM2, managed 236 mph at the Reno Races. There's a tailplane on top of the fin! Very distinctive!



The Boland modified Mong Sport flown by Bill Woods to first place in biplane class at the '89 Reno Races. Even the prop is white. De Chastel pic.



The Cassutt Okie Streaker of George Budde at Reno '89. What size servos in this one? De Chastel pic.



A Yak 11 flown at Reno by Bob Yancey. Developed by Russia late in WW2. Very fast, says cameraman de Chastel.

it comprised a $\frac{1}{4}$ roll to the left, a further $\frac{1}{4}$ roll left, $\frac{1}{4}$ roll right, then two more $\frac{1}{4}$ rolls left, a $\frac{1}{4}$ right until all eight points were completed back to upright. No wonder she is in World Championship class.

By far the most graceful flying was performed by veteran pilot, Bob Hoover, in his Shrike Commander and Sabreliner. Bob's one-wheel touch and go and four point roll in the Shrike with both motors stopped and props feathered was outstanding. It was matched only by Lefty Gardner in the P38 White Lightning. The graceful loops and barrel rolls from ground level up, of this historic machine were a magnificent sight.

The novelty or Ripley segments left the crowd spellbound. The Double Take Pitts, with much-enlarged and modified wings, flew off upright, aerobatted and landed inverted, taxiied around inverted, took off again and landed upright. The only one of its kind in the world to do so.

Daredevils (I have another word for them) rode untethered on the wings of biplanes, performing acrobatics with aerobatics before climbing onto the upper wing **during** flight to be attached to a pylon, permitting the pilot to do inverted passes at low level with the passenger watching the ground rush by only a few feet from his head! Believe it or not, one team was a father and son; no family arguments here!

The show went on and on, interspersed with racing heats, top commentary, food and drink available everywhere, "Ooohs" and 'Aahs" and a great atmosphere among the paying patrons. Truly one of the most fantastic aero displays I have seen, and one that would make our CAA authorities, who are so, correctly, safety conscious, shudder at even the thought of condoning such a spectacular display.



The GR7 Panther Blue Streak of Bob Boyd and Jon Sharp. Can do over 230 mph in the high, dry air at Reno. The fuselage streak is blue!



The American Special designed by John Parker. An Unlimited Class machine with a Lycoming 350 hp turbo engine. It is small. The pilot is partly supine. Seen at Reno by Ron de Chastel.

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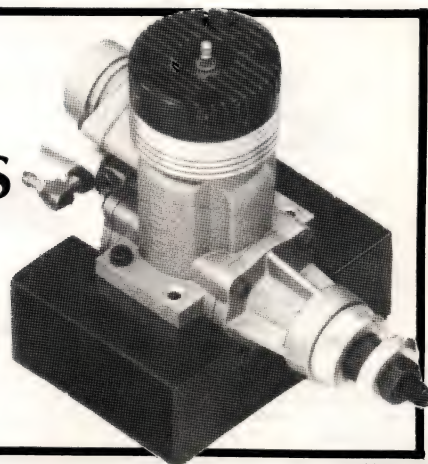
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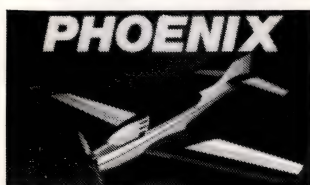
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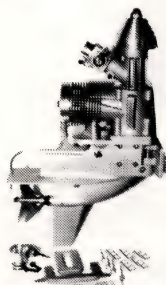
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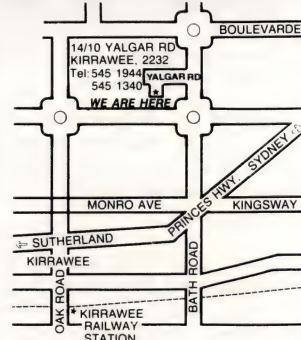
FUTABA 7 UAP



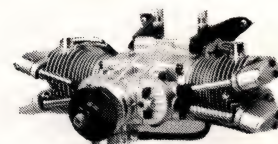
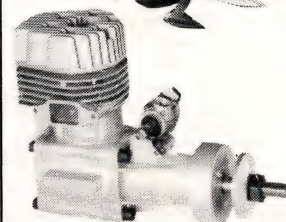
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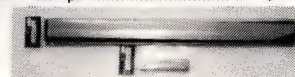


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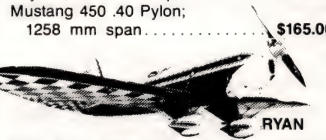
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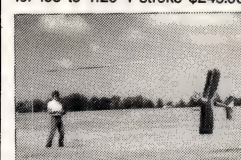
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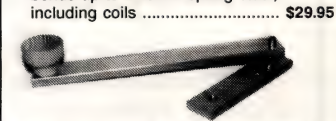
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THE SPORTSTER

A TRIBUTE TO KEITH HEARN

by Mark Bishop



Mark's Sportster; neat, simple shapes and well proportioned. The Sportster was a trend-setter nearly 30 years ago. Today the vintage appearance is just as appealing.

Re-introduction

The Sportster was the first big model aeroplane that I had built. In 1965, at the Victorian Squadron Air Training Corps Model Aero Club, we progressed from chuckies to control line to rubber powered then on to the Sportster. Keith Hearn was the MAC Training Officer and designer of the Sportster.

My first Sportster was guided (most of the time) by an OS single channel radio set. The 2AP valve transmitter, 4A valve receiver and rubber escapement consumed my paper-round money providing for their appetites of 135, 22 and 4.5 volt batteries. Only one model could fly at a time with the 27 MHz super-regen receiver. A Taipan 1.5 cc diesel provided power. My second and third Sportsters were guided with an OS 12 channel superhet reed radio with Bonner Transmite servos on rudder, elevator and motor. We could now fly five models at a time on 27 MHz. Power was from an OS 2.5 cc glow. The third Sportster is still in service with Futaba gear.

Four years ago Keith Hearn's son, Bruce, gave out Sportster plans at the MARCS' Keith Hearn Memorial flying day. The idea was to have a rudder-only Sportster competition the next year. So I started building number four.

The Sportster is fairly typical of most models designed around 1950: high mounted flat bottom wing; lifting tailplane; and light built-up frame structure fuselage. With a 50 inch span (designed before metrics) it is quick and cheap to build. The plan says free flight or radio control, but the

radio conversion details are fairly limited. I decided to build the narrow ($2\frac{1}{8}$ inch wide) free flight fuselage and fit a Taipan 1.5 cc diesel, Futaba Clubman radio, 500 mAH nicad with one S128 servo for rudder. Modifications for radio were kept as unobtrusive as possible.

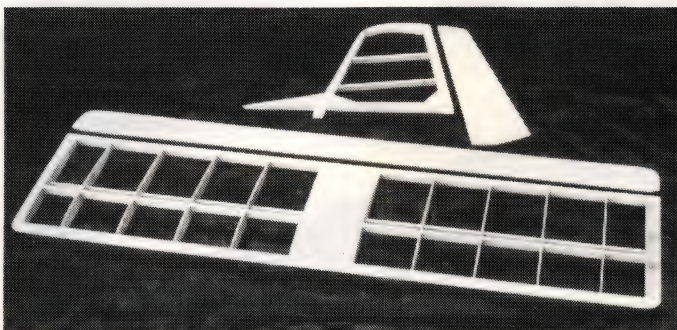
SPECIFICATIONS

Wing Span:	50 inch
Wing Chord:	10 inch
Wing Area:	490 sq. inch
Tail Span:	22 inch
Tail Chord:	7 inch
Tail Area:	154 sq. inch (31%)

Construction

Cut rib templates for tailplane and wing out of $\frac{1}{16}$ inch ply. (Don't forget the slot for the wing LE sheet support spar.) Ribs are cut from quarter grain balsa sheet with a sharp knife. Block three building boards for wings and centre section to the correct dihedral and build the wing over the (plastic covered) plan. I used a 1 inch trailing edge instead of $\frac{7}{8}$ inch, and notched the ribs $\frac{1}{8}$ inch further into the TE. This helps to stop warps. Add a dihedral brace to the rear spar and gussets between the TE and LE and wing root, and all corners of the tailplane. Add ply strips on wing TE to protect it from damage by rubber bands. If you are fitting elevator control, use a 1 inch trailing edge section for the elevator and fit a full depth spar ahead of this, keeping the original outline.

Lengthen the fuselage between F1 and F2 to 4½ inches. Add a ply bulkhead to the removable



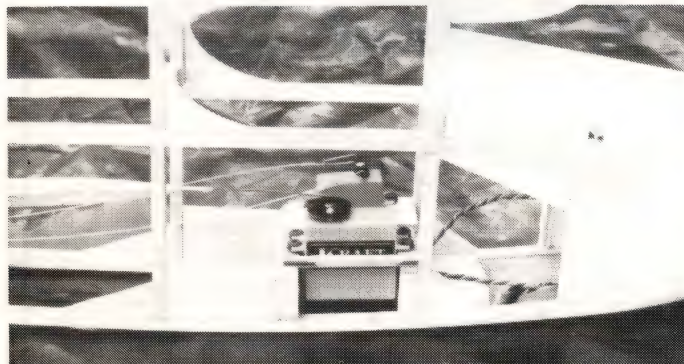
Tail components of the Sportster, modified for radio control. Elevator is 20% of tailplane as shown on the plan and gives good pitch control but is not needed in gentle turns.

cowl between the motor and the fuel tank. A fitting and bolt from the bulkhead retain the cowl. Keep the u.c. bolts accessible, as the u.c. has to be removed occasionally to straighten it after landing without elevator. This provides some shock absorption. I used a 1.5 cc diesel engine with 1 washer of downthrust, which provides plenty of power if you keep the model light.

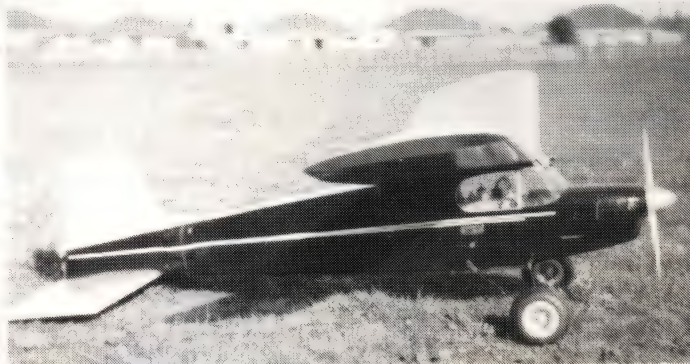
I soldered up a tank, but any suitable stunt tank will do. Don't use a team race tank as fuel will leak out when you turn the model over to start the engine.

Build one fuselage side over the plan, cover it with plastic, then build the second side over the first. Add $\frac{1}{8}$ x $\frac{1}{4}$ balsa cross braces to all open fuselage bays on top, bottom and sides. Add a $\frac{1}{16}$ inch ply bulkhead to the forward face of the $\frac{1}{4}$ square uprights located 2½ inches to the rear of F2. This ply bulkhead extends to the top and bottom of the fuselage, has a cut-out at the bottom for battery access and a hole for the wing attachment dowel.

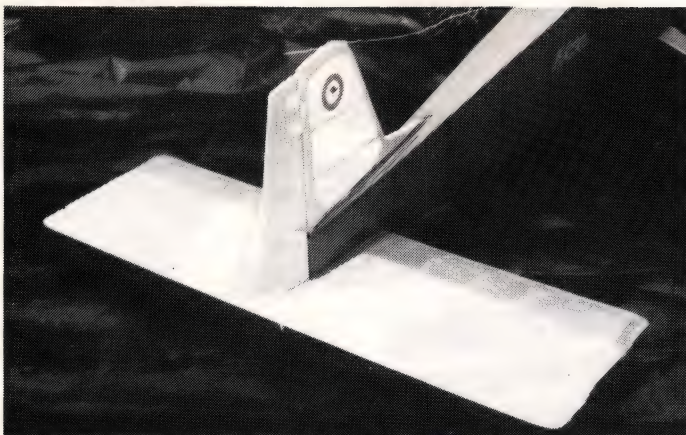
Bind and glue a fine piano wire brace from the wing dowel to a bolt on F2. Add a cross brace to the fuselage 7 inches behind F2. Add small $\frac{1}{8}$ inch balsa gussets around the cabin area between the uprights and cross braces. Add a $\frac{1}{4}$ inch balsa hatch behind F2 on the fuselage bottom. Fill in the fuselage under the fin with $\frac{1}{8}$ inch balsa and make the rudder full height. $\frac{1}{4}$ inch triangular blocks attach fin to fuselage. Locate the rear tailplane and attach dowel $\frac{1}{4}$ inch higher and lengthen to $\frac{3}{8}$ inch.



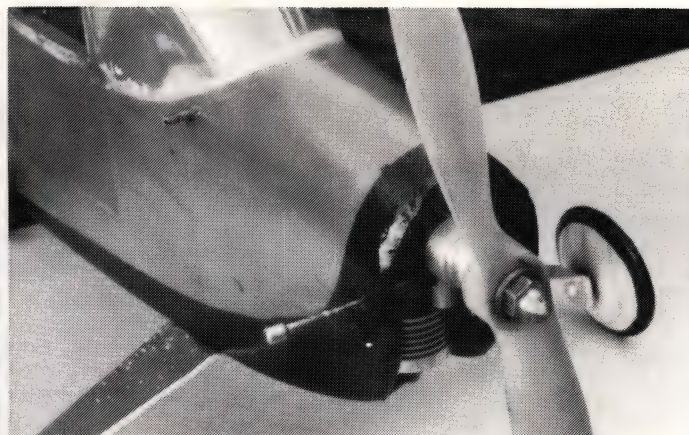
Servos mounted on plywood tray mounted on balsa cross pieces. Gussets provide extra strength in this area. Receiver sits in front of servos and battery further forward, just behind engine bulkhead. Keep gear well forward to give proper balance.



Sportster by Geoff Scott, August 1961. Note that cabin is occupied by Rx with valve. Hatch on rear of fuselage is for winding the rubber of the escapement. Red fuselage, silver flying surfaces. Nose profile shows high standard of Geoff's modelling.



Completed tail is neat. With tailplane on bottom of fuselage, rudder is full height of fin and gives outstanding yaw control. Cloth hinges are supplemented with RC hinges near control horns. RAAF roundel signifies Keith's long association with the Air Cadets.



Nose is not fully cowled as on original, to ensure good cooling airflow for Oliver Tiger Cub. Engine behaviour inverted was real grouse! Altogether a truly delightful little model to fly. Please excuse dural leaf undercarriage; it was a quickie to ensure that photos could be taken before the deadline.

Cover with Solartex after fuel-proofing the nose area and behind F2. I finish my Sportster the same as the picture on the original kit box, with antique yellow covering, and red painted nose and wing LE. Fuel proof, fit radio and set rudder movement 1/2 inch either side. The weight when ready to fly came to 2 lb 1 oz, which gives a wing loading of 9.7 oz per sq ft.

Flying

Set the CG at 40% MAC (4 inches from wing LE), and test glide over long grass. Adjust glide trim with tailplane packing. My Sportster requires 1/16 inch packing on top of the tailplane TE in calm conditions, and 1/8 inch in winds of up to 10 knots. Don't fly in winds stronger than that or you might lose it downwind. Check 1 washer downthrust (front of motor). Make the first powered flight on a calm day, with a 1/4 tank of fuel in case the model is way out of trim. Hand launch fairly fast at a level attitude. If your model looks like stalling, apply rudder to kill the stall.

The Sportster has a low engine-off rate of sink at a slow airspeed, due to its wing loading. Due to its drag it has a poor gliding angle, so keep close to the field with the engine off. Turns drop the nose, so don't make low turns. Wagging the rudder will give a slight flare for landing.

At the MARCS' Keith Hearn Memorial flying day 16 modellers flew their rudder-only Sportsters. The Sportster is a delight to fly, with absolutely no vices. With 1/2 inch rudder movement spiral dives, loops and barrel rolls can be done. I have even thermalled it for over 30 minutes. A rudder-elevator-motor version makes an ideal RC trainer. Build a Sportster; you won't regret it.

POSTSCRIPT

The Hearn brothers designed and produced a range of model aircraft, which were sold and distributed from the famous hobby shop in Flinders Street, Melbourne, during the 50s and 60s. Bruce has copies of some of the plans which he would like to make available to vintage enthusiasts and admirers of the Hearn's Hobbies' designs. The following list gives details of what is available from Bruce at 24 Minerva Crescent, Vermont South, Vic., 3133. Please write directly to him; not to Airborne. And include an SASE for an answer to your enquiry. He has Fax No. (03) 566 5729.

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Ace; 36 inch Stunt Model
Demon; 41 inch Stunt Model
Hellcat; 1.5 cc Stunter
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Frisky; 2.5 cc Stunter
ME109; 1 to 1.5 cc Stunter
Mustang; 1 to 1.5 cc Stunter
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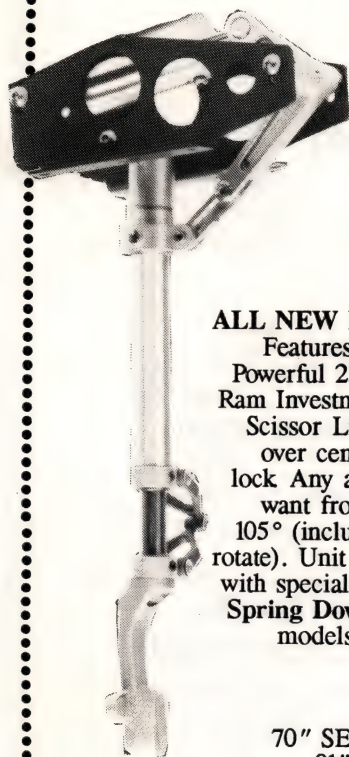
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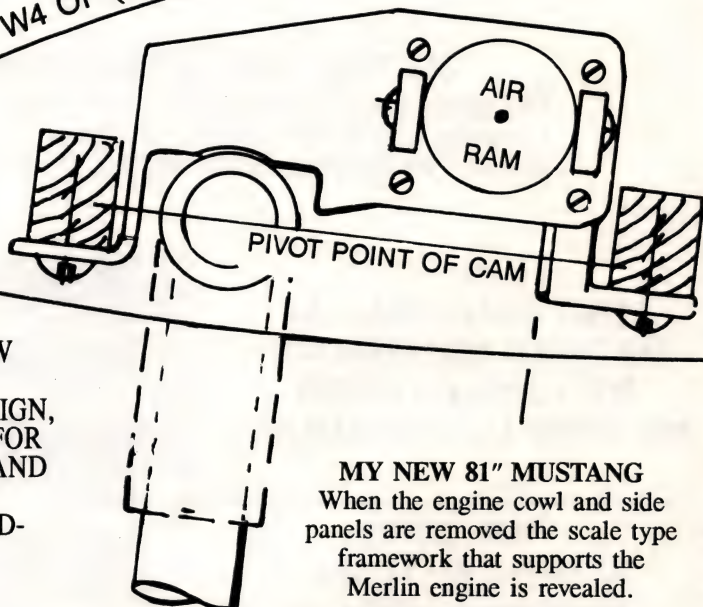
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The Airborne **ENGINE-EAR**

A LITTLE HISTORY

The Magnum Hi-Max engine, tested and reported in this august journal (not last August, Gregorio!), are true blue aristocracy: made in England. Modellers new to the field might be surprised to know that England has been making engines since - since, probably before I was born. (So long? you ask; cheeky blighter!) Modellers as old as I will remember the host of names of days past and recognise names still reappearing. For a few years the engines produced were of a rather specialised type, appealing to (mostly) long-standing modellers, and generally in the smaller sizes. Possibly the emergence of the super accurate production machinery spurred some of the long-standing manufacturers to enter the field of popular sizes and give challenge in the arena dominated by Japanese companies. Names such as PAW, DC, Irvine and Magnum (England) are now well known on flying fields throughout the world and are showing well that they can stand the fierce competition.

Magnum engines first appeared in 1979, and two of the engines, the .91 and 182 V twin, made a considerable impact in the four-stroke stakes. I purchased a .91 open rocker in those days that is still going well and performing quite comparably with current engines of similar size. This particular engine is still being manufactured, with only a name change: it is now the Classic 91. Magnum, as such, ceased trading in 1986, and a new company, Magnum '86 Ltd, emerged. The current range of engines was updated and given a new cosmetic appearance. A further 3 engines of 30, 40 and 60 cc capacity were added, and these make up the total Classic range.

The 30 and 40 cc engines are V twins which,

according to reports, give outstanding performance. Most readers will, by now, know of my leaning to twin cylinder engines, with a particular leaning to the Vs, and the sight of these two engines gives me sweaty palms. I think I might have to have words with the Magnum people about this affliction some time. For those of you who desire to have cylinders poking out of odd places in the cowl of your model, check out the Manx engines: 3 cylinder radials of 45 and 60 cc capacity. They give me the impression that they are just waiting to rip the firewall out of a sloppily built model: really mean machines of 3.5 and 5 BHP, and with an appearance that commands respect and admiration.

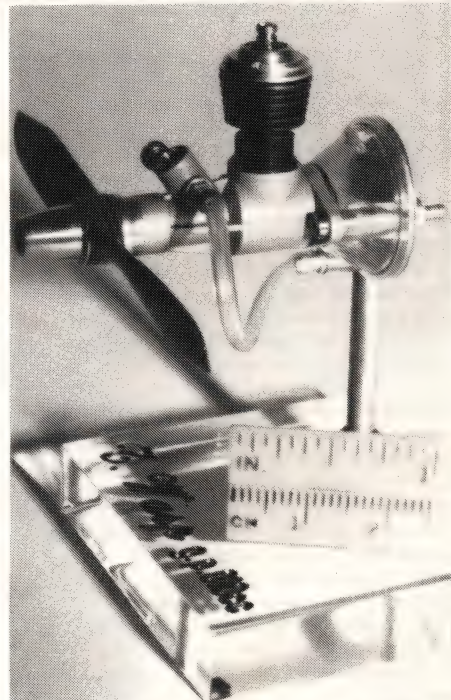
Not content with the existing range of engines, the Magnum engineers threw a few parameters into the computer, left it run for 12 months, and it spat out the design formula for the Hi-Max engines, which have been described hitherto. Since space has already been used for that, to catch up on the good oil, get a back copy from the august manager of this rag, *er.* magazine: ordering details on page 5.

HAVING A FIDDLE

No! I haven't taken up violin lessons! I did that years ago instead of becoming a boy soprano. Fiddling is converting a glow engine to spark, or adjusting the ports and the like. For example, the one-piece head and cylinder barrel with its deep finning on the Saito engines might encourage you to convert the engine to spark ignition and run it on petrol. Well, here's a little warning regarding the glow plug. The plug supplied with the engine is well matched to the performance, so leave well enough alone, except in the case of plug failure. In line with performance modifications, you will find most glow plugs in latter day strokers are set close to the exhaust valve. The smaller the engine the closer the plug, and in the hemispherical (half a tennis ball shape) combustion chamber of the Saito .40 and .45, the plug is almost impinging on the valve seat. If you damage the plug thread there is not enough metal in which to fit an insert, which means a moan in the wallet. This is common with most strokers and I don't know of any with a brass insert for the plug, so you are threading straight into the head. As the plug life can be as long as the life of an engine, with four strokes, this area is not a problem generally.

However, some modellers insist on mucking around with the plug or removing it to insert after-run oil. Every time you remove and replace the plug you run the risk of stripping the thread. As you should well know by now, I have been bashing your ears about the benefits of after-run protection, but not in the plug hole. This area least needs it as the only residue found in this area is oil, as most other fuel components are evaporated by the residual heat. Besides, if you do the job correctly through the nipple in the backplate, the after-run oil will find its way to the top of the piston as well as the rest of the engine.

I use equal parts (thereabouts) of petrol and Dexron automatic transmission fluid injected with an old syringe. I flush the oil in and out several times, finishing up with a suck. This mix cleans the inside of the engine of all harmful residue and gumming oil, and leaves all the components



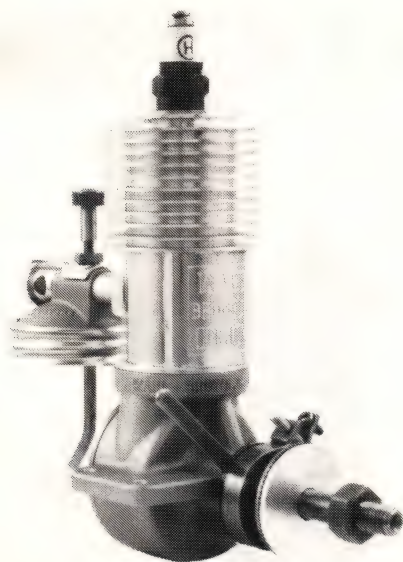
The World's smallest glow plug engine, says Stu Richmond. Giovanni Ceccarelli made about 25 of them for swapping. Displacement of the Tiger Wasp is 0.01 cc, only 60% of that of the Cox 010 which is 0.01 cu in. Look for the Tiger Wasp in the Guinness Book of Records for 1990. Photo from Stu.

nicely coated with Dexron, which gives good protection against corrosion. If I am going to store the engine for a time I then load it up with Hangar 33 after-run storage lubricant. I have pulled the head of engines 12 months after this treatment and still found the red slick of the Dexron on top of the piston so forget about removing the plug for this purpose.

Saito engines have two rocker covers with (I almost forgot them) fibre gasket seals. With the covers removed, all adjustments and checking can be done quite easily with two hands (as opposed to the need for three hands on some jobs I have encountered at times). After the running-in period, in which the tappets will need to be adjusted, the occasional check every 4 or 5 hours will also suffice for the addition of a little lubricating oil to this section. The maincase section needs little attention other than the flushing mentioned and the correct mounting procedure on true beam mounts or, my favourite, a Paxolin plate. Of course, I expect you to keep the engine clean, but you do that, don't you?

LOOKING AT PROBLEMS

Straight into a problem from Peter Eldering of Darwin, NT: "... I have just purchased my first 4-stroke, an OS FS .20. I asked around the club about fuel, and there the problem commenced. Some are using 5% Synlube, 5% castor, balance methanol; one is using his regular 2-stroke mix of 20% castor, 80% methanol, and nobody uses nitro. The OS instructions say not less than 20% lubricant. In his book 'The TC 4-Stroke Engine' Clarence Lee (USA) suggests that 15% lubricant



The Brown Junior, custom made by Herb Wahl, is a replica of the famous engine that was designed by Bill Brown specifically for model aircraft, back in the early 1930s. Wahl has used the best of Brown's features and the techniques of Walt Hurlman, who began production of the engines, combined with modern methods. This photo of Andrew Kennedy's engine is by Graham Rice.

ENGINE-EAR

is sufficient, 12% if you are careful, up to 18 % (I suppose if you are not careful!) with nitro from 5 to 15%. I have looked back through the last couple of years of AIRBORNE for your articles and found plenty on diesel fuel but little on 4-strokes (how remiss of me. bw) other than Magnum premix in engine reviews. I fly my 2-strokes on 8% Synlube, 2% castor, 5% nitro, balance methanol and they do not seem to wear out. (You must also be tuning them correctly, Peter, as this plays a big part in engine life.) I would like to continue using Synlube in the 4-strokes. From the apparent huge variety of options of fuel mixes, there must be one mix that is better than the others. Could you please give me the benefit of your experience on a Synlube-castor-nitro mix?

I also use your After-Run oil, which probably helps keep my engines in good shape, and this leads to another question. I have purchased quite a few bottles of the After-Run, and before I get halfway through the bottle the contents appear to partially dry out. I keep the top on and store the bottle in the fridge, but I think that the climate probably causes the problem. What remains is a wax which I considered to be the stuff which coats the innards of the engine and does the good work, so I re-dissolve it and continue using it. The only solvent that I found to do the job is mineral turps, so I have been using this and it seems to do the job. I hope that I am doing the right thing. Please re-assure me.

PS. What is the best method of getting After-Run into 4-strokes? I believe that they need different treatment from 2-strokes in regard to the bearings."

Answers: Be re-assured, Peter. Help is here! First off, the fuel problem. I understand the confusion as there are many brews that ARE THE BEST. I sometimes wonder if anyone uses just an ordinary mix. Actually, there is no one wonder mix suitable for all engines as there are too many factors to consider. A large engine can be run on less oil due to larger clearances or the use of ball and roller bearings while, on the other hand, a high oil content can cause hydraulic (engine cannot be turned over and appears to have something stopping the piston from going up) and some loss of power in the smaller engines. The oil to fuel ratios can also cause you

to tear your hat off and jump on it when you consider that 5% of Synlube is (purported to be) equal to 20% castor, and if you use Klotz you need 20% to do the same as 22% castor while, on the other hand, if you use 20% castor you only need 15% due to its superior lubricity, not forgetting that condensed milk makes your coffee sweeter and I'm going to New Zealand riding a pushbike backwards, or is that a backward pushbike or a pushbackbikeward? (Slap! Slap! several deep breaths - thank you dear.)

Being a simple sort of soul I try to avoid complications, and I find that 10% Synlube, 5% castor, 5% nitro and 80% methanol works well in both 2 and 4-strokes for testing purposes where no specific mixture is set down (e.g. 12% castor in OPS 4-stroke). This is Magnum premix and is available to all modellers in Oz. For private use I use the same mix less the nitro, but I replace this with any type of petrol if a 4-stroke is a bit new and, as such, a bit cold on the idle. If you are a bit cautious about the low amount of oil in YOUR fuel mix, try this simple test. With the engine running flat chat, hold a teaspoon or something similar about half an in.. ooops - 12 mm behind the exhaust outlet for about 5 seconds. It should be oily! If not boy are you cooking that engine. After a bit of consideration and experience I am not happy with a pure synthetic fuel for 4-strokes, as this does not provide the cushioning for the gears and cam followers that castor does. I have examined engines run on the Magnum formula for 100 plus hours and they showed no sign whatsoever of wear in the gears or cam followers other than a highly polished surface.

The nipple fitted to the crankcase of a 4-stroke is to allow the sump to breath and expel excess oil. **This is not to be used as a pressure nipple.** To do this could cause internal damage to your engine. It is through this nipple that you flush the engine and inject After-Run oil. I pump a mixture of 50/50 Dexron auto transmission oil and petrol in and out of the sump about 5 times, ending with a suck out. (With a syringe, you fool, not the mouth.) If the engine is going into the hangar for some time, I then inject a couple of ccs of After-Run and seal the engine in a plastic bag, making absolutely certain it is moisture-free: no water, that is. If you suspect that your engine has

any water in it, spray with WD.40 (typical) before sealing the bag.

The liquid content of the After-Run can dissipate, particularly in hot weather, but this is of no concern. Peter hit the jackpot! The wax does the job, the rest is a carrier to get the waxes throughout the engine. The carrier is mineral turps or white spirit.

ADD LIGHTNESS FOR POWER

Having looked at lots of engines over a long period of time, it is easy to be impressed by the improved power output of the current crop. In just about any engine size, the early models would hardly pull the skin off a rice pudding, but the latest ones need to be bolted down before opening the box. Some of this power comes from lessening the reciprocating weight, improving piston acceleration to give more usable power.

Another source of increased power is the use of two narrow compression rings rather than the one rather wide ring usually employed. Further improvement comes when the conrod is substantial, with bushes both ends and oil holes top and bottom, reducing the distortion and improving lubrication.

So, pistons with cut away skirts, reduced skirt thickness, even lightening holes like the Magnum Hi-Max 120, rings that reduce surface contact with the cylinder and carry lubricating oil, and fluted conrods with oil holes all add lightness and power.

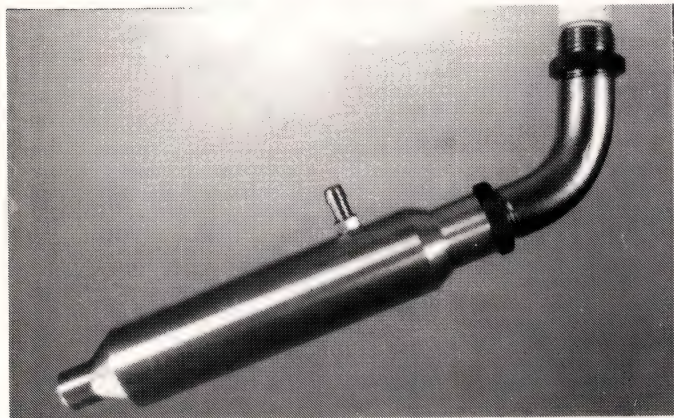
Now, since carbon is much lighter and much stronger than steel, and self-lubricating, I wonder if

UNDER INSTRUCTION

Well ... that's my lot for this month. I'm now off to tech to continue my course on Do It Yourself Dentistry. I'm not going so well so far, as I have had a number of nervous attempts to fill one of my teeth, but I can't seem to progress past the self administration of sleeping gas.

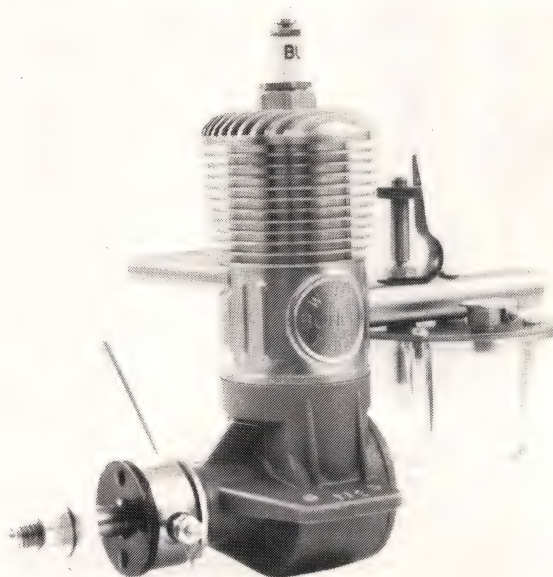
Phil De Tank

Brian Winch, 33 Hillview Pde., Lurnea, NSW, 2170. Please include an SASE with your questions for a prompt reply, and write your name on the back of photos with a soft pen.



Remember to include the muffler in your maintenance schedule. Keep the retaining bolts or gland nuts tight. Clear the pressure nipple after the engine has been idle. Enlarging the outlet may increase rpm but also increases noise.

A Wahl replica of the Bunch Tiger, a composite version of many Bunch engines, closely resembling the 1939-40 Aero Tiger, and using other proven ideas to provide the best performance and long life. This engine belongs to Andy Kennedy. The superb photo was taken by Graham Rice.



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With epoxies: coat fastener threads, immerse into mixed epoxy, let cure, remove and leave a perfectly tapped hole, matched to the fastener, in the epoxy; mating wing saddles, coat one surface, cast epoxy or lay-up cloth directly over protected area, allow to fully cure, separate parts.

The cream is non-toxic and is patented technology.

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- Anti-seize barrier cream
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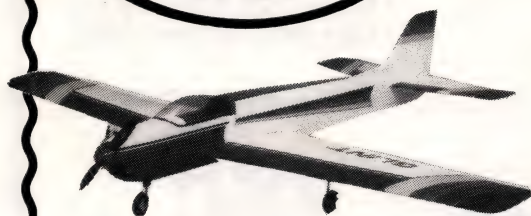


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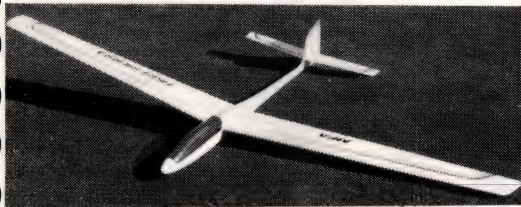
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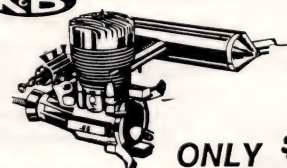
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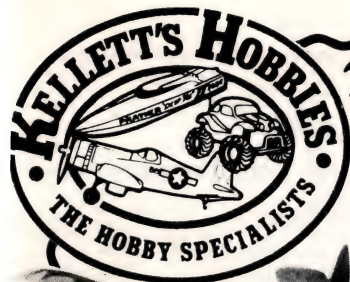


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by Phil Stevenson

PRODUCT NEWS

Peter Pine is now importing the **Altec Gearbox** pieces in bulk, and packaging the sets here. To get the price down to \$50 he is now offering the Altec with one ratio only and one backplate, just as everyone inevitably uses it. He still stocks the 4 mm **gold plated bullet connectors** that I referred to recently as being difficult to find, for systems using more than 50 amps.

The big news comes from our friendly Swiss-Aussie electronics designer, Hans Sommerauer, via Peter. For the past 3 years I've made references to Hans developing a new **Super Charger**. Peter finally has a production model. The charger uses a micro processor to control, monitor and record what is happening while its other hardware charges anything from 4 to 30 cells at up to 3 amps constant current, from a single car battery. A single liquid crystal display screen shows: the nicad voltage; the current; the time it has been charging; that it is in Quick Charge Mode; and the voltage of the source car battery. When the charger senses the nicad voltage peak it sounds a 20 second alarm, then cuts back to a trickle charge of approximately 1/20 of the current initially set manually. The display then changes to show: the nicad voltage; the trickle current rate; the time that it has been on trickle; that it has changed to Full, or Trickle Mode; the peak voltage at which it changed over; and the source voltage.

All this is packaged in a durable box with the normal Sommerauer high standard of workmanship, serviceability and failsafe design features. The cost of almost \$700 will certainly limit the market to the super enthusiasts.

For those with less to spend, **Astropower** has the new range of **Astro Chargers** from the US. These include a peak detection model which can charge from 4 to 12 cells, and costs a little more than \$200.



Zoltan Enoch with Child Prodigy HLG converted to electric with Kyosho AP 29 BB motor, 7 x 450 mAh Sanyo cells and Graupner 7 x 3 folder. Photo from Phil.

From **Aristocraft-Hi Tec** comes a new series of relay switches ranging from a simple auto cut-off relay for use with a 2 channel radio and no motor control, to a full 3rd function RC on-off with auto cut-out, brake and battery eliminator. The model used for the Thermal Challenger review worked well and featured BEC, auto cut-off and third channel operation. Prices vary up to \$50.

For those who prefer a local product, **Keith Emery** has a new **relay switch**, with just simple 3rd channel operation for a similar price. (See ad. in **AIRBORNE** No. 97.) Some will remember Keith from the innovative extra function-switch he designed and produced for 2 channel radios a few years back. He still makes these too, if you need to get an extra function from an 2 channel set.

FLYING REPORTS

NSW 7 Cell Glider Championship; Goulburn, December 1989

Electric soarer events are becoming a bit rare, as the electric fold seems to be going the way of fun flying, so it was pleasing to see a good roll-up at Goulburn. They even arranged perfect weather. The event is basically the duration section of the international F3E event, requiring a precision 5 minute flight, with minimum motor run. Up till now most models were about 1.8 to 2.0 metre span, lightly built and slow flying. After this event models may well shrink considerably, so as to get high more quickly using a shorter motor run.

Peter Pine won, flying a strengthened Astro Mini Challenger (about 1.5 metres). Power was a small model Hectoplet. With 7 x 900 SCR Sanyos, this model goes up somewhat like Peter's World Champs F3E model. Matching the model's performance, Peter also flew well, searching out lift and landing accurately, for top points.

Second was Steve Wiessner with a larger, old style model, also well flown, but without the blistering climb. Bob Cummerford from Glen Innes was third, also with a mini Challenger, but with the more standard Kyosho 360 ST, as used by Steve also.

The most interesting model was Zoltan Enoch's very small Child Prodigy, a converted RC HLG. This uses a ballraced AP 29 mini motor and 7 x 450 AR Sanyos. This resulted in by far the lightest model, and a climb to match that of Peter Pine's model. Unfortunately, Zoltan damaged it and did not complete all rounds.

ELECTRIC RALLY

from Kurt Tanner

The Dandenong Knox Radio Aero Club's annual Fly-In, held on Sunday 12 November, attracted a number of participants in the electric category. Electric aircraft types ranged from powered soarers to aerobatic sportsters. Of course, as with any branch of our sport, the relationship of increased sophistication and cost seems to follow a square law, but a surprising aspect is just how well a carefully matched minimum electric power system and aircraft can perform. It may be that many RC pilots will find



At the DKRAC Fly-In, Neil Hardiman with his beautifully finished Bluebird. A fine performer too. All blue? No! It has a white nose! Pic from Kurt Tanner.

attraction in this type of electric aircraft as an adjunct to, rather than the mainstay of their fleet.

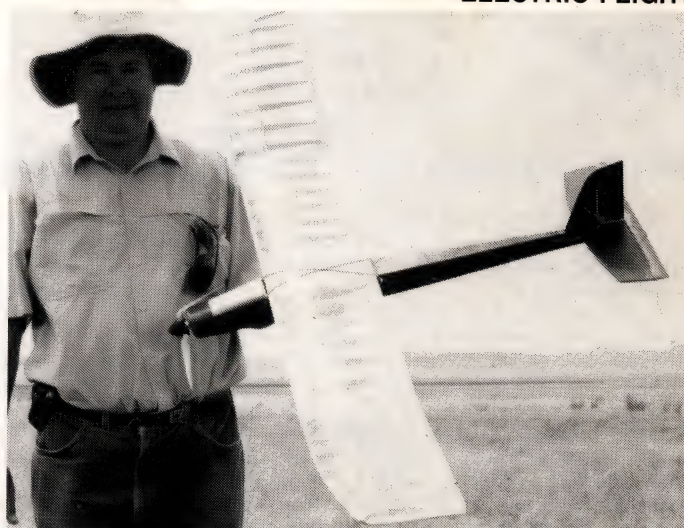
At one point during the day all internal combustion powered activity was called to a halt and the field was given over to electric. A number of electric soarers took to the air and, in conditions that could only be described as marginal, most pilots achieved flight durations many times their motor run times. Unique to electric flight, of course, is the ability to restart one's motor when there is a need to search for more lift. It was obvious to onlookers that the pilots were enjoying themselves. This was fun flying.

Motor control methods on participating aircraft varied. The simplest system was 'nil' control: power is connected to the motor at launch and the flight continues until the batteries run down. The disadvantages are that the batteries will be excessively discharged (not recommended) or damage may result due to a high current draw in the event of a crash which results in the propeller digging in and the motor stalling. An aircraft without landing gear may also encounter motor stall at flight's end, because electric flight systems cease to produce useful power before the batteries are fully discharged. Les Whitfield's Trident and Bruce Thompson's pair of Snarks featured nil motor control and all posted successful flights on the day.

A simple form of motor control which was prevalent in electric aircraft at the Rally was 'full down on-off'. This method uses a proprietary push on - push off type switch, similar in operation to the on-off switches on many desk lamps. The switch is installed in the aircraft so that it is operated by the elevator servo at full down. This means that successive applications of full



Steve Wiessner with 2M electric GRP fuselage from his glider mold. Power system consists of Kyosho 360 ST, Altec gearbox, STW controller and 7 x 1200 mAh Sanyo cells.



Bob Cummerford with Astro Mini Challenger. Kyosho 360 ST, 7 x 900 mAh Sanyo cells, Altec gearbox and Meyer folding prop. PS photo.

down elevator will switch the motor off, then on, and so on. Of course, the switch used must be rated to accommodate the current drawn by the motor, usually fairly high, even for small motors.

Many of the electric soarers featured folding propellers for reduced drag. However, a further problem is introduced in that above a certain airspeed a free wheeling prop may be reluctant to fold. Neil Hardiman confirmed this with some exciting experiments which involved holding his electric soarer, sans wings, in the airstream from a moving vehicle. Some form of motor braking is required to ensure that folding props do so, and this is effected simply by shorting the motor terminals after the power is removed. Electric aircraft using full down switched motor control can implement motor braking quite simply by using a changeover type switch and some minor wiring changes. Indeed, many of the attending aircraft had this feature.

Protection of the electric power system is another consideration. Many motor batteries in common use are capable of delivering close to 100 Amps under short circuit conditions, possibly leading to battery damage or even fire. Bob Hickman fuses all his electric power systems by soldering into circuit a glass cartridge type fuse that will carry the normal motor operating current. He feels that the small voltage drop across the fuse is worth the protection it gives.

Modern electronic motor speed controllers can overcome some or all the disadvantages associated with simple power systems, albeit at increased expense. In addition, of course, they feature the sort of motor throttle control that most of us are used to. One pilot suffered an unusual power system malfunction with his Fast Eddy, which is equipped with an electronic speed controller but not featuring overload protection. The motor had become loose in its mounting and had twisted round, causing the motor connecting wires to short and destroy the controller. Warren's consolation was that the battery pack was saved from damage.

Most of the electric soarers seen at the Rally had wing loadings of between 12 and 14 oz per sq ft. Exceptions were Malcolm Buckmaster's Raser and Neil Hardiman's Bluebird, both very light at 7.4 and 9.7 oz per sq ft, respectively. In the air Neil's beautifully finished Bluebird certainly impressed, but all gliders seemed to deliver

adequate performance, so wing loadings of around 12 oz per sq ft would appear to give a happy medium between flyability and achievability. Also in the light wing loading category was Malcolm Buckmaster's Trenton Terror old timer. At 12.9 oz per sq ft this aircraft looked great as it slowly floated around in the calm conditions prevailing.

Quite a few of the Rally attendees displayed good aerobatic capability. Electric aircraft do not yet possess the excess of power we sometimes see with Schnuerle two-stroke powered equipment. None the less, the aerobatic performances seen on the day were impressive. Warren Canning's Acromaster, having the distinction of the highest wing loading on the day, needs to be flown 'on the wing', and performed a comprehensive schedule of manoeuvres. His much smaller model, the Fast Eddy, also exhibited the characteristics that a sport pilot looks for. In contrast to the Acromaster it has a relatively inexpensive power system consisting of an Air Supply motor, direct drive and 6 cells. The Acromaster, on the other hand, uses an Astro 15 Cobalt motor with gearbox and 12 cells. That old square law cost spiral. The greater appeal of smaller models from a cost point of view may be off-set to some extent by the requirement for lightweight airframe and radio equipment to achieve good performance.

Very lively in the air was Bob Hickman's own design, Red Terror. Using a simple power system consisting of Kyosho AP29 ball race motor direct driving and 5 cells, this aircraft had a wing loading more like that of a glider, a paltry 12.4 oz per sq ft. At 35 inches span with aileron, elevator and full down on-off, this order of lightness is a real achievement, and the resulting healthy performance must be very satisfying.

David Hobby's Kyosho Flash is a purpose designed electric ARF. David has re-engined the Flash with a Kyosho 480WS, previously having been powered by a 240S motor, and it displays good aerobatic performance and excellent flight duration.

The Almost Ready to Fly category was well represented, a total of six being present at the Rally. Warren Canning's P51, the smallest aircraft attending, had a first launch mishap, and Ivan Chislett's Valencia went out of radio range on take-off due to a retracted transmitter antenna. The remainder all logged significant flying time.

Bruce Thompson had a big smile on his face after one of his two Snarks, previously an emu (i.e. earthbound) made a successful flight after being fitted with a different propeller. The ARF path to electric flight has been well documented in AIRBORNE, and may have appeal to many.

Attending on the day were Peter Russell of Eastern Hobbies and Malcolm Buckmaster of Astropower Australia. Both kindly brought along and showed some of their wares, an expanding range of specialised products for electric flight. Many non-electric RC pilots would have been impressed with what they saw at the Rally and it may well be that some of them make this rapidly developing facet of our sport an extension to their current participation.

For enquiries and contributions I'm at: **6 Crown Street, Henley, NSW, 2111.** Photos will be returned in your self-addressed, stamped envelope.



Bob Hickman shows the modest proportions of his OD Red Terror; a really rapid electric! Tanner pic.

KIT REVIEW

Kit supplied for review by Wings 'N' Things Hobbies

G.M. Products THERMAL CHARGER

This is a conventionally built balsa kit model designed and manufactured in America, but the swept back V-tail and pusher motor make it a quite distinctive kit.

It was a very pleasant surprise to find that every shaped piece of sheet wood was exactly the right size and shape, and that every piece of strip wood was also the exact size to match each notch or adjacent piece. Because of this it became necessary only to find the right piece, put it in place and run in the CA glue. Despite this, a lot of the wood was very tough, particularly the sheet strips used for the trailing edges. This may well yield a stronger model, but at some cost in weight.

Design

Spanning only 1.5 metres, but with a generous chord, the model is small for 7 cells. The Leisure 05 motor, 6 x 2.5 prop and switched harness are included, and seven 800 AR cells are recommended. The small prop allows the ballraced motor to rev out to over 15,000 rpm, but with only a 12 amp draw, so the model is definitely the right size for this moderate power.

Building

The fuselage is built up from two 1.5 mm sheet balsa sides, with innumerable small stringers and cross pieces, in a way only the yanks like to do. The resulting fuselage is roomy, quite light and very strong, but my instincts and patience would prefer something with about half the component count.

The wing is conventionally constructed with spruce 1 beam spars, sheet trailing edge, cap strips and 6 mm square leading edge on the diagonal. There is no leading edge sheeting, but the wing is of quite low aspect ratio and fairly stiff.

The V tail is built up from strip wood and gussets with sheet ruddervators.

In all cases everything went together effortlessly by following the beautifully presented instruction manual, complete with numerous photos. All pushrods, horns and clevises are included, but a mixer for the V tail is needed. I used the stand-

ard DuBro unit as recommended on the plan. Control was from a new Aristocraft Challenger 455 PCM Hi Tec SP 1001 BEC relay switch in place of a microswitch (as supplied), removing the weight of a third servo and the receiver battery.

Finished weight was 1.25 kg, which was high considering the weight saved by using the BEC switch. It exceeded that quoted in the kit. Probably this was due to the heavy wood and the extra strength of the Profilm used.

Flying

As usual, a deadline nears and calm weather vanishes! Undeterred, I charged it up and sent it aloft. The climb was smooth, but not world shattering. (Remember 12 amps, which gives 4 minutes from 800 AR cells.) The noise of over 15,000 rpm on an open framework wing sound box was strange for a 'silent' model. None the less, it climbed to a good height and once there handled the gusty weather with not the slightest hesitation.

On later flights the Tx was passed around and it looped and strap rolled. The consensus was that it felt a bit twitchy so, for the next day out we added about 5 mm of washout to each tip and moved the CG to the forward limit shown on the plan. We also opted for more oomph, and changed the 6 x 2.5 prop for a Taipan 7 x 4. This brought the current draw up to about 22 amps, and lowered the rpm to a level where the sound resonating through the wing was not as obtrusive.

The difference was amazing. It now climbs as briskly as most seven cell competition gliders, hands off, and the glide is smooth and flat. It will still loop and roll, if that's what you want, but when left to thermal hunting it behaves perfectly.

The higher power reduces the motor run to a bit over 2 minutes, which is still plenty for two or three good climbs to thermal height.

Kit distributed to hobby retailers by Speedline International, P O Box 338, North Ryde, 2113.



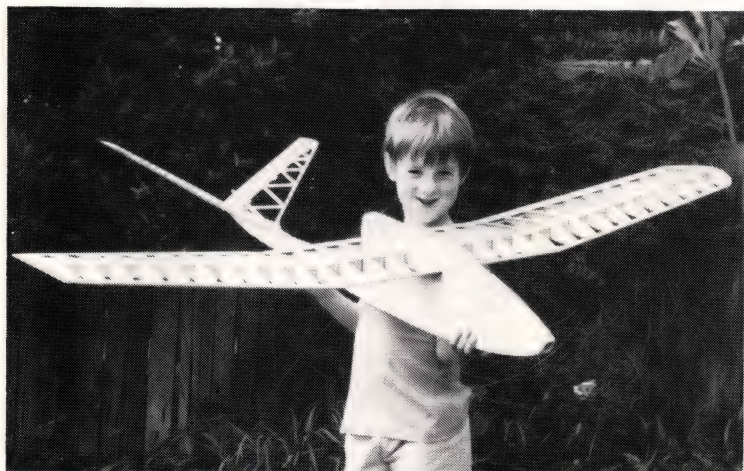
Thermal Charger showing low AR wing and distinctive V-tail. Colour scheme is Dayglo orange and white in Profilm. Nick Siefken does the honours for the columnist with the camera.

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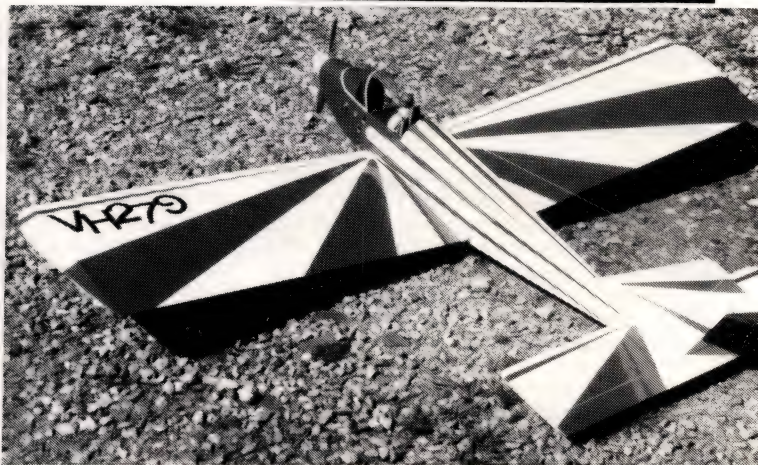
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Andrew Stevenson with the framework of the GM Thermal Charger. Excellent fit of parts enabled fast, accurate assembly, but heavy wood resulted in heavy, if strong model.



New version of the Astro Flash, a low wing version with the same wing, more dihedral, same tail and new fuselage. Details of plans and power systems from Astropower Australia.

Modelling is for fun: satisfaction with safety.

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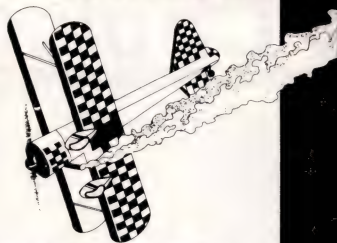
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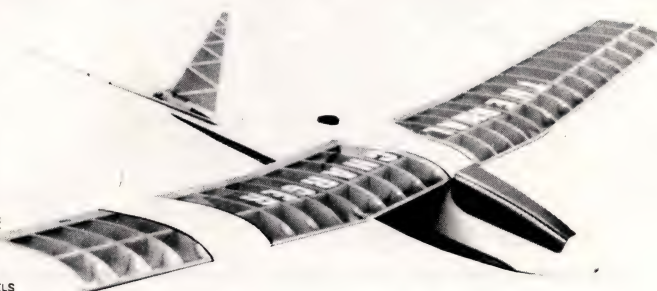
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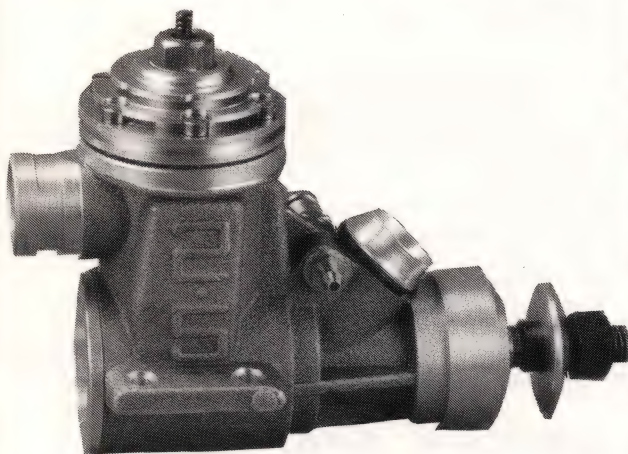
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For Old Timer Sake

by Colin Borthwick

ON THE SHELF

This issue I intend to cover a little more of the OT modelling scene in the US, with particular emphasis on the engine collecting scene. It seems that more people are becoming interested in collecting the original engines that used to power our current creations. During my first sojourn in the US last year I had the opportunity to spend a couple of days in Denver, Colorado, visiting with Tim and Betty Dannels. Merrilllyn and I flew from San Antonio, Texas, to Denver, and drove our hired car downtown to our hotel, the fabulous turn-of-the-century Brown Palace.

On checking in we were given a note from Tim and Betty, welcoming us to Denver. This set the tone for the next two days. How I wish we could have stayed longer! For the non-engine collectors out there, let me explain that the Dannels run the Model Museum and publish the Engine Collectors' Journal, twin labours of love. The ECJ is a virtual bible for collectors world-wide, and is high on the list of haunt-the-mail-box publications that arrive at this address. The Dannels have been publishing the ECJ since Joe Wagner, father of MECA, ceased publication in 1963. I have seen a lot of magazines, devoted to various aspects of our hobby, come and go in that time. At this time a subscription to the ECJ costs US\$10.00 for six issue. This is about A\$2.00 per issue. Good value, what? Remit in US funds, payable to: Model Museum, 1265 Yates Street, Denver, CO 80294, USA.

A visit to the Dannels house is akin to a visit to Aladdin's cave for OT modellers. Tim and Betty have probably the most comprehensive collection of model aeroplane engines anywhere: everything from Arden to Vivell. I was taken with the McCoy collection, which is missing only one engine in the total inventory of engines manufactured by Dick McCoy, Dura-matic and Testors. Every engine except McCoy 60 #3. If you happen to have such an engine I am sure you could become a lifetime buddy of Tim and Betty! Most of the engines are on display and are set up by type. There is also a general display of the Wonderful World of Engines, featuring a key engine from each country. A truly great display.

Tim, not as active on the OT competition scene as he was when the first SAM Champs was held



The McCoy collection. Only 1 engine is missing from this display by Tim and Betty Dannels. This shot, originally in colour, is enough to firewall the throttle of any engine collector's mind, but will probably suffer loss of definition in the processes for publication. The display sets the standard for other collectors.

in Denver, has developed another fascinating branch of our hobby. He builds exquisite 1/4 scale replicas of famous old free flighters and displays each model with the type of engine with which it was originally powered. These models range from the 1930s to the 1960s. The aeroplane that took my eye was a Carl Goldberg Valkyrie. Tim built the full size model, with over 2000 individual pieces of balsa, and flew it in competition for some time. The 1/4 scale model has, almost unbelievably, the same number of pieces of balsa. I hope that the photographs are suitable for reproduction as this is truly a beautiful replica. Thank you Tim and Betty, not only for your hospitality, but for your on-going dedication to the engine collectors of the world.

WAY OUTSIDE THE NINE DOTS

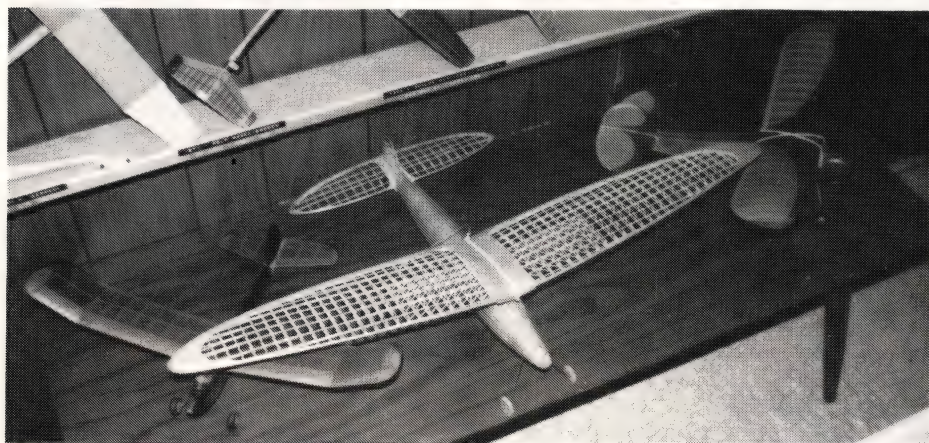
During a recent SAM 84, The Vintagents, meeting we got to discussing the cut-off date for OT and Vintage models as set out by SAM NA. As a lot of current dabblers in the OT movement are in their fifties, we gave some thought to the type of models we grew up with. The name Vic

Smeed kept coming up, and the most popular design from that prolific plan penciller was, by general agreement, the Tomboy. This 36 or 44 inch sportster, powered usually by a Mills .75, was, as we remembered, a great flyer. Barry Dent then suggested that we all build a Tomboy, power it with any type of engine up to 1cc and fly it in a ratio type event, to be held prior to the SAM Champs this year. As my building programme was already tight, I decided to get onto my Tomboy straight away. John French thought the same way, so there are two examples, with several more on the board.

As the only requirement was that the outline be followed, I decided to be a touch avant guard and incorporate an all-flying tailplane, build super light and power the wee beastie with a Cox TD .051 on pressure. With lightweight Micafilm keeping the air out, and carbon fibre re-inforced main spar, the model weighed 11 1/4 oz. The first flights were spectacular, the little Tomboy climbing like a good OT Duration model, and I was getting over seven minutes on a 20 second engine run. Enter Nemesis! The above-mentioned John French, Melbourne's gift to Queensland, asked me down to the Gold Coast for a few flights. It was blowing a gale and I noticed that John had not even brought his Tomboy. This should have been warning enough. Trevor Boundy from Melbourne was present with the video camera to record the proceedings. I lit up the little Cox and nodded to John to let it go. A spirited climb into a nasty wind-shear had the carbon fibre re-inforced (?) main spar crack and the model spiralled down, still under full power! No damage except for the broken wing, which will not be rebuilt, but redesigned!

Just for FUN, why don't you build a Tomboy and have a ball? It might be a Playboy beater! Let's put the FUN back into our hobby. Enjoy!

None of the above represents an attempt to change the SAM cut-off dates, but is merely thrown in for a change of pace.



The 1/4 scale Valkyrie, with all of its over 2,000 pieces, with a Bombshell and a Powerhouse, in the Dannels' Museum. Actual span is 2 foot six, a good size for rubber power CB photo.

Modelling is for fun: satisfaction with safety.



From Max Hayes, having returned to modelling after an absence of 35 years, this photo was taken at Reservoir about 1946 by Tom Warburton, a member of the Elsternwick District MAC, as was Max himself. From left to right, back row first, are: Unknown, Phil Rankin, Wallie Hastie, George Mallett, Unknown, Norm Bell (holding model in front of previous person), Jim Grieve, Bevern Dunne, Unknown, Ray Harwood (headless at RH end). Kneeling, front row: Unknown, Unknown (some have suggested Alan Lim Joon, but Max doesn't think so), Cyril (Someone, who worked at the old Central Aircraft), Rex Davis, Jack Fife, Unknown and Pop Hearn (father of Jack, Bruce and the late Keith Hearn). Max would like to know the names of the Unknown modellers. Can you help?

DOES THIS APPLY TO YOUR CLUB?

This is a story about four modellers named Anybody, Everybody, Nobody and Somebody. Their club had a very important job to be done before the annual OT Championships could be held. Everybody was asked to do it. Everybody was sure that Somebody would do it. Anybody could have done it, but Nobody did. Somebody got angry about it because it was Everybody's job. Everybody thought that Anybody would do it but Nobody realised that Everybody wouldn't do it. It ended up with Everybody blaming Somebody when Nobody did what Anybody could have done.

OLD TIMER QUIZ

In response to an overwhelming avalanche of requests, here is yet another OT Quiz to test your

memory.

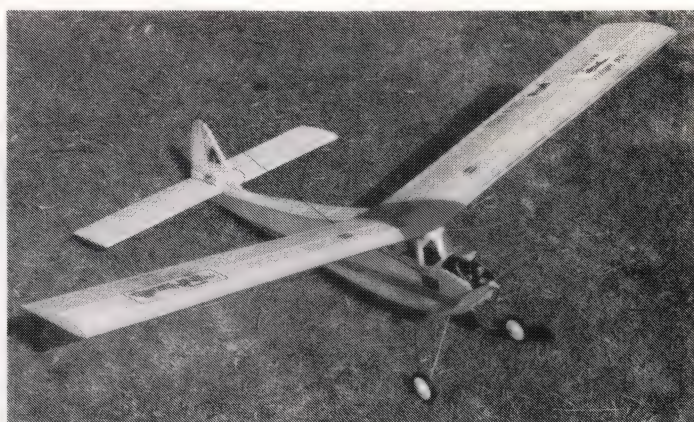
1. What current kit manufacturer was a member of the 1929 US team to England for the Wakefield competition?
2. Which two modellers are credited with the introduction of Microfilm (not Micafilm) to the hobby, and what was the year?
3. For those among you who have qualms about covering your latest OT pride and joy in a film type of covering, worry no more. There was a pre-war film covering. Its name please.
4. We sometimes see ignition model aeroplane engines using a magneto instead of coil and condenser. There was an engine that featured an integral generator. Of course you know its name, and that of its designer!
5. Was SAM always called SAM?

6. Are you having FUN flying OT models? If not, why not? Let's put the FUN back into it.

MORE FROM MAX HAYES

"Phil Renkin, George Mallett and Cyril all worked at Central Aircraft Company at various times. Phil was also President and, I think, founder of the old Elsternwick club. Not long after this was taken he went to England and I don't know what became of him after that. I believe Bevern Dunne (I think that's how his name was spelt) later went back to New Zealand. I did see his name mentioned in Airborne's Old Timer column about 1977 or '78. I see that Norm Bell is still very active in aeromodelling from articles in Airborne.

In case some of the readers are interested, I will endeavour to identify some of the models.



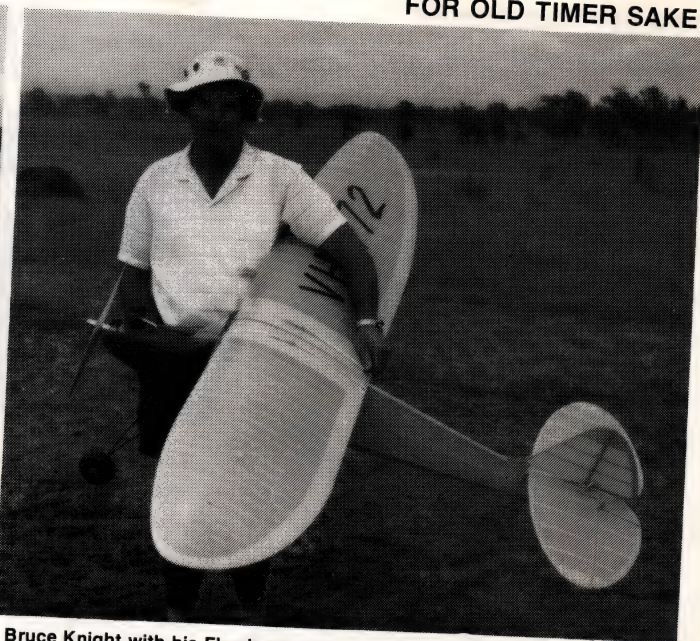
Tomboy by Colin Borthwick. Vic Smeed's design from the early 50s is suitable for lightweight RC gear. A Cox TD 051 gives it sprightly performance. A Mills 75 would give it more ladylike behaviour.

Quarter scale replicas of free flight power models in Tim and Betty Dannels Model Museum in Denver. 'How many can you name?' asks photographer Borthwick.

Modelling is for fun: satisfaction with safety.



Bill Britcher with his Torpedo 2 from AIRBORNE plans. Won the Texaco event at the Constellation OT day in October '89. An excellent windy weather model, low drag, and a Saito 45 engine. Top of wing is fully sheeted, and an excellent monocoque fuselage. Note Tx neck strap. Photo: Howie.



Bruce Knight with his Flamingo, captured by the John Pond camera at the Purga Field at the Nats. As usual Bruce has built a beautiful model beautifully.

Phil Renkin is holding the Central Stork (I think); anyhow, it was his own design and was kitted by Central Aircraft Co. (I still have the plan of this one). Wally Hastie's was also an original design (as far as I know). It was lost at Reservoir on another occasion (went OOS in fog) and was found a week or so later by a farmer near Camperdown. Wally was unable to claim what would have been at least an Australian record because it was not an official attempt. Ray Harwood was holding his Foote Westerner which originally had a Barker 60 for power and later was powered with a McCoy 49. Cyril's model was Pete Neat's Hi-Ball, an Aeromodeller plan that, I think, is still available. Rex Davis and Jack Fife both had Dizzy Diesels, also an APS design. The rest

were either original designs or designs that I am not familiar with. Once again, some readers may readily recognise some of the models in the photo."

Contributions to the Editor, at RMB 1798, Benalla, 3673, please.

1. Lou Proctor of Proctor Enterprises, Aurora, Oregon, was a member of the 1929 US team.
2. Robert Clary and Jerome Kittel of Englewood, New Jersey, formulated Microfilm in 1931.
3. Planefilm. What a clever name for the product!
4. The Generator Clipper, designed by Hugh Gunter, more were manufactured as coil and condenser engines using battery power.
5. From approximately October 1964 until May 1965, SAM was named AMA. Not the AMA we know now, but the Antique Modelers' Association. Due to confusion between the two AMAs, the name was changed to the Society of Antique Modelers.
6. You will have to provide your own answer to this one.

Answers:

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A Matador 60 4-stroke in the nose of a Lackey Zenith. BOTH models made by Bruce Abell. The Taipan 14 x 6 turns at 6000 rpm and idles down to 1500 rpm. A great effort by a real Old Timer. Bruce took the pic, too.

FOR OLD TIMER SAKE CANOWINDRA RE-VISITED

from John Quigley

To those who fly Old Timer models it is a Mecca to which an annual pilgrimage is travelled like a religious ceremony. Some start arriving Tuesday afternoon to savour the calm of pre-contest Canowindra, and to greet those who will be arriving over the next three days. By Thursday morning the contingent of modellers has grown and many good yarns are told over morning tea and afternoon barbecues. By Friday afternoon the quiet mid-western town is transformed into a bustling throng of modellers, machines and mayhem! There is always much interest in new models, especially for those who have ventured to build something other than a Playboy. What motors have members dug up? Fuels and props for models are the themes of the corroborees.

The formalities start Friday when processing takes place in a local hall. Everyone gathers here for this great informal meeting to renew old friendships and review models. Close by is the traditional CL Old Time Model Rally, orchestrated by the serene John Abbot. This is where any old, generally pre 1952, CL model can be brought and flown without the concern of being in a competition. There is another tradition here: there is a trophy BUT the winner is selected by the pilots and there is no entry fee. The only rule is that the model must be flown once, but not necessarily by the owner!

Saturday is **Texaco** day. There can be up to 14 models in the air at once and what a delightful sight it is to see the large Texaco models drifting around the clear Canowindra sky. Watching the fly-off is magnificent. Being in it is an experience all Old Timer flyers should aim for at least once. There is more tradition in Texaco. The father of Old Timer flying, John Pond, has donated to SAM 1788 a beautiful perpetual trophy for the winner of this event. Tradition also dictates that the previous year's winner of this event has to present to the new winner a Top Gun hat. Canowindra has its lighter side.

On Sunday there is **DURATION**. This is the speed day of Old Timer flying. Not quite as sedate as Texaco but in its own right a great day. The sheer thrill of guiding or watching the climb of these models is breath-taking. Duration too has its traditions. Some time ago a perpetual trophy was initiated for Duration. As this event is horsepower based, some time was spent looking for a willing and appropriate donor. Gordon Burford fitted that bill perfectly, as his motors have contributed to many modellers' early success. Gordon accepted the challenge and we



An old bi-plane, smart in red and white. This version by Norm Foote is twice original size. Can't see the engine and don't know what it's covered with, but they look like Trexler wheels! Photo from John Quigley.

gave him a free hand to do whatever he wished. He manufactured a trophy out of a Caterpillar D8 tractor piston with a person holding a Lanzo Stick power model. This is indeed a worthy addition to the tradition.

Sunday night is the wind down SAM 1788 barbecue where a community hot-plate is set up in the camp site and everyone is welcome to gather for a long table feast.

Monday brings 2 cc and Half A. Again there is a perpetual trophy for 2 cc. This is a handsome trophy manufactured and donated to SAM 1788 by Harold Stevenson, consisting of an artifice array of propellers.

SAM 1788 receives generous help with prizes from Model Flight and Old Fashioned Models, together with assistance from some of the Canowindra business sector. Last year in Texaco and Duration there were official prizes to seventh place, with prizes to fifth in 2 cc and third in 1/2 A. Old Fashioned Models kindly supply three kits to be given as prizes. In the past we have drawn a name of a contestant who did not make the fly-out of a hat. This is done for Texaco, Duration and 2 cc. We have Open Orders for midrange flyers in Texaco, Duration and 2 cc. There is also an Open Order for participation. This is awarded to a member who presses on and flies the 5 rounds in the spirit of SAM. There was a most generous donation last year from one of our members. It consisted of a \$50 donation for Texaco and Duration to the highest placed tissue or silk covered model. I hope that SAM receives similar encouragement next year. That kind of incentive can sway the constructor to the more traditional methods when a model is about to be covered. That's the spirit of SAM.

Juniors are not forgotten, either. All juniors who enter and fly receive a "goody bag". These bags, together with the Open Orders, are kindly donated by Model Flight. There is also a Junior FF and RC Champion Trophy.

There is a small but very enthusiastic FF contingent who really have the SAM preamble in their contest. They fly about 6 different events over the weekend. There is a move for this band of merry men to start at a more traditional FF time in 1990. This may even assist some RC flyers who still have FF in their blood to get their flights in early before the RC starts.

Breakfast on the field; what better way to start a day's flying than with breakfast on the field, discussing the weather and thermals. Cornflakes, sausages, eggs, bacon, tea or coffee and toast - and time for the non-flying contingent to catch up on some sleep.

To be part of this laid-back extravaganza of Old Timer flying, write to:

SAM 1788 Secretary, Dave Brown,
52 Outer Crescent, Lithgow, NSW, 2790.

SAM 1788 publishes one of the best newsletters in Australian modelling. It contains information on engines, with three views, sketches of Old Timer models, history of models, contest reports etc. This publication is called Duration Times. SAM 1788 is affiliated with the US body and all Australian members receive SAM Speaks.

Plans are well under way for the SAM 1788 Champs to be held at Canowindra over the Easter period 1990. Come to the Mecca of OT flying and join the other 80 or so modellers who were there in 1989 and who must return for their annual nostalgia fix!



Todd McGuffin with his So Long for the 2 cc OT event. Juniors have done well at OT meetings. Is that a PAW with a Taipan prop? JG photo.



Arthur Cooper and Bob Rowe prepare the Lanzo Bomber for another flight.

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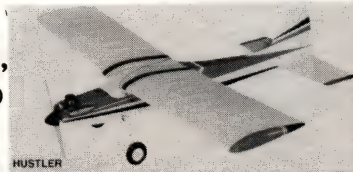
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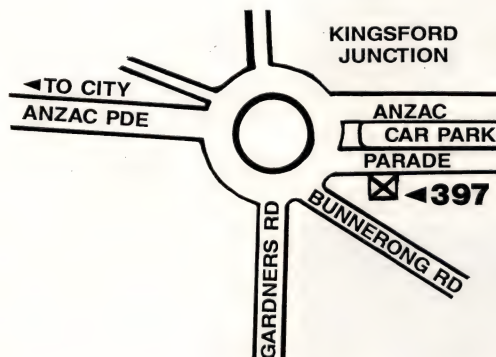
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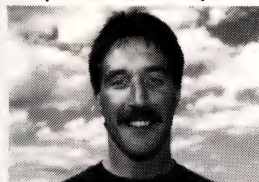
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Instructor 'Wally'

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Rob Barbuto (right) 1st place '89 Nats; Geoff Woodward (left) 2nd.

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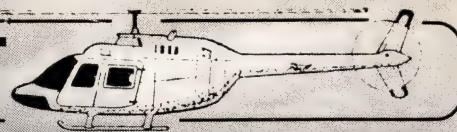
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ROTOR ROUNDABOUT



By Max TANDY



Dave Bennett of Maryborough (and still a long way from the camera) travelled down to the Rotor Round-Up and got flying with his Schluter Mini Boy.

HELP MAKES THE WORLD GO ROUND

Max was prevented from submitting copy for his column for this issue by poor health. Help him by sending him your news and views, photos of your models, reports of your flights and comments about flying. And don't keep all your design and engineering secrets to yourself either! Send them to 9 Smailes Rd, Jimboomba Qld., 4280.

After 3 months Joseph Mraz does not need a Tandy training undercarriage for his X-Cell Quicksilver. And what's more, he's fanning the laundry in the back garden! Good gear and a confident pilot. Mraz pic.



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Genuine Stanley Knife Blades (pack of 5).....	\$2.95	\$2.25
Snap Blade Trimming Knife (12.5mm black).....	\$1.95	\$1.25
Replacement Blades (pack of 10).....	\$3.95	\$2.95
Utility Knife (20mm blade).....	\$1.95	\$1.25
Straight Cut Tinsnips 200mm.....	\$7.50	\$6.50
Straight Cut Tinsnips 250mm.....	\$8.50	\$7.50
3 Piece C Clamp Set.....	\$7.95	\$6.95
Coping Saw (steel frame/wooden handle) 200mm.....	\$7.95	\$4.95
Replacement Blades (pack of 10).....	\$3.95	\$3.50
Hi Quality Replacement Blades (pack of 16)		
Xtra Fine.....	\$7.95	\$6.95
Medium.....	\$7.95	\$6.95
Fine.....	\$7.95	\$6.95
Wood Carving Set (7 piece).....	\$18.50	\$16.50
Hacksaw (steel frame & handle) 180mm.....	\$5.95	\$4.95
Replacement Hacksaw Blades (pack of 10).....	\$4.95	\$3.95
Paasche Type H Series Airbrush w/Propellant.....	\$49.95	\$29.95
Hi Point Balancer (Gorham).....	\$69.50	\$59.50
Portable Parts Washer 6v or 7.2v.....	\$59.95	\$49.95

DRILL BITS METRIC/IMPERIAL/NUMBER ALL 10% OFF

Number Drill Set w/Stand.....	\$46.50	\$39.95
Bearing Cleaner Module.....	\$38.50	\$29.95
Bearing Removal & Alignment Tool.....	\$26.50	\$22.50
Mini Surface Ground Vee Block.....	\$36.50	\$29.95
Heatshrink Gun (hot air type).....	\$66.50	\$58.50
Brass Wire Brush.....	\$6.50	\$5.50
Ugly Stick Wire Brush.....	\$5.95	\$2.95

DIAMOND RESHARPENING STONE

Resharpener all your X-Acto Blades		
Small.....	\$34.50	\$26.50
Large.....	\$49.50	\$39.50

Pushrod Z Bender.....	\$28.50	\$19.95
Socket Glow Clip Short.....	\$12.50	\$10.50
Socket Glow Clip Long.....	\$16.50	\$14.50
Kwick Clip.....	\$5.95	\$4.95
Glow Driver Battery Small.....	\$7.95	\$6.95
Glow Driver Battery Large.....	\$12.50	\$10.50
Rechargeable Glow Battery 4000mAh SCR.....	\$22.50	\$18.50
Fuel Priming Bottle w/Nozzle & Nipple 350cc.....	\$4.50	\$3.50
Quick Fill Primer.....	\$18.95	\$16.95
Spray Mate (for solvents, degreasers, etc) 500ml.....	\$4.95	\$3.95
Sullivan Electric Starters.....	\$69.95	\$59.95
Replacement Starter Cones.....	\$22.50	\$18.50
Buggy Starter Rubbers.....	\$7.95	\$6.95
Spinner Starter Rubbers.....	\$4.50	\$3.50
Engine Test Running Block.....	\$16.95	\$14.95
Elec. Motor Test Running Block.....	\$7.50	\$6.50
Pinion Gear Caddy.....	\$22.95	\$19.95
Pin Connector Removing Tool.....	\$8.95	\$5.95
Electric Motor Analyzer & Tune Scope.....	\$225.00	\$185.00

DREMEL 576 Motoshop 1990 Model.....	\$395.00	\$295.00
Replacement Cutters and Sanding Pads also available		

DREMEL 3960 Variable Speed		
w/40 Accessories & Sturdy Plastic Case.....	\$195.00	\$175.00

DREMEL 2750 NEW 1990 Constant Speed		
Mototool w/15 Accessories.....	\$129.50	\$119.50

DREMEL 225 NEW 1990 Flex Attachment		
w/Tool & Chuck. Now as Small as a		
Dentists Tool. Great for Detail Modelling.....	\$89.50	\$79.50

JUST SOME OF OUR MOTOTOOL ACCESSORIES CURRENTLY ON SPECIAL

DREMEL 409 Cut Off Wheels.....	\$12.95	\$10.50
DREMEL 402 Mandril for above.....	\$6.50	\$5.50
DREMEL 407 Drum Sander Coarse w/Mandril.....	\$8.95	\$7.50
DREMEL 408 Drum Sander Band Coarse.....	\$7.95	\$6.50
DREMEL 432 Drum Sander Band Fine.....	\$6.95	\$5.95
DREMEL 7144 Diamond Tip Grinder.....	\$28.50	\$24.50
DREMEL 90825 Mototool Brushes.....	\$10.50	\$8.50
DREMEL 7134 Diamond Tip Engraver.....	\$28.50	\$24.50
DREMEL 105 Engraving Cutter.....	\$5.95	\$4.95
DREMEL 59940845 Moto Tool Bearing (pair).....	\$9.50	\$7.50

**LARGEST RANGE OF DREMEL MOTOTOOL
ACCESSORIES AVAILABLE ANYWHERE!!
ASK US FOR OUR DREMEL TOOL BIT CATALOGUE**

GLUES & LUBES

Hot Stuff (Super T) 1/2oz.....	\$5.95	\$4.95
Hot Stuff (Super T) 1oz.....	\$8.95	\$7.95
Hot Stuff (Instant) 1/2oz.....	\$5.95	\$4.95
Hot Stuff (Instant) 1oz.....	\$8.95	\$7.95
A/F C17.....	\$2.25	\$1.95
A/F C23.....	\$2.25	\$1.95
Wilhold 4oz.....	\$4.95	\$3.95
Wilhold 8oz.....	\$6.95	\$5.95
Plastruct Plastic Weld.....	\$6.95	\$5.95
Zap Z Foam Primer.....	\$8.95	\$7.95
Devcon Epoxy Glue 5 min 9oz.....	\$19.95	\$17.95
Devcon Epoxy Glue 24 hr 9oz.....	\$19.95	\$17.95
UHU Kontakt Super Thin Contact Adhesive.....	\$2.95	\$2.50
UHU PVC.....	\$2.95	\$2.50
UHU All Purpose.....	\$2.25	\$1.95
UHU Styropor (won't affect Styrofoam).....	\$4.95	\$3.95
UHU Hart Balsa Cement.....	\$2.95	\$1.95
UHU Quickset Epoxy 5 min.....	\$7.95	\$6.95
UHU All Purpose Glue Stick.....	\$2.25	\$1.75
Super Glue Remover Small.....	\$3.50	\$2.95
Super Glue Remover Large.....	\$6.50	\$5.95
Loctite Spray Contact Adhesive 350gm.....	\$13.95	\$12.50
Faller Expert Plastic Cement.....	\$5.95	\$5.50

Faller Oiler (non corrosive to plastics).....	\$6.95	\$5.95
Triflow Teflon Lubricant 2oz.....	\$6.95	\$5.95
Triflow Teflon Lubricant 4oz.....	\$8.95	\$7.95
Triflow Teflon Lubricant 6oz.....	\$14.95	\$12.95
Nulon L80 Lithium Based Grease.....	\$9.50	\$7.50
Tamiya Ceramic White Grease (excellent for servo gears).....	\$7.95	\$6.95
Tamiya Moly Grease.....	\$6.95	\$5.95
CRC Silicon Spray Lube 500gms.....	\$8.95	\$6.95
CRC 226 Electrical Contact 350gms.....	\$7.95	\$6.95
CRC Lectra Clean Aerosol 500 gms.....	\$10.50	\$9.50
CRC Lectra Clean w/Dispenser 4 litre.....	\$79.50	\$69.50
Ultralite Superfine Teflon Lubricant.....	\$9.95	\$8.95
Liquid Bearings (won't attract dust).....	\$9.95	\$8.95
Hi-Temp Silicon Lube Silicon Grease.....	\$10.50	\$9.50
Slip Stream Polish (great for hulls, fuselages, bodies).....	\$12.95	\$10.95
Electric Motor Spray Cleaner F1 500ml.....	\$16.95	\$15.50
Electric Motor Bath 500ml.....	\$16.95	\$15.50
EDL Methanol Fuel Lubricant Synthetic 1 litre.....	\$32.50	\$29.50
Klotz Methanol Fuel Lubricant Synthetic 1 gal.....	\$58.50	\$48.50
Glow Glide Methanol Fuel Lubricant Synthetic 500ml.....	\$8.50	\$7.50
Castrol M Methanol Fuel Lubricant Castor 1 litre.....	\$12.50	\$10.50
Castrol M Methanol Fuel Lubricant Castor 4 litre.....	\$36.50	\$28.50

NI-CADS & CHARGERS More Power for your Model

500 mAh AA.....	\$3.95	\$2.95
600 mAh AA Tagged.....	\$5.95	\$4.95
700 mAh AA Tagged.....	\$6.95	\$5.95
250 mAh AAA Tagged.....	\$5.95	\$4.95
1200 mAh SUB C SC/SCF/SCR.....	\$10.50	\$8.50
???? mAh SUB C SCE.....	\$11.50	\$9.50
1800 mAh SUB C SCR.....	\$14.50	\$12.50
4000 mAh D SCR.....		
Rechargeable Glow Plug Battery.....	\$22.50	\$18.50
12v 7 amp Gel Cell.....	\$59.59	\$49.95
240v Trickle Charger for Gel Cell 12v.....	\$16.95	\$12.95
240v Trickle Charger for Gel Cell 6v.....	\$16.95	\$12.95

TX/RX/ALL NI-CAD PACKS CAN BE CUSTOM MADE TO YOUR REQUIREMENTS NI-CAD PACKS INCLUDE HEATSHRINK AND LEADS READY FOR USE

Sanyo AA Alkaline (pack of 4).....	\$3.95	\$2.95
Sanyo 9v Alkaline.....	\$2.95	\$1.95

DISCHARGE RESISTORS

DC-1 Slow Discharge (ensures cells are properly discharged prior to use) 7.2v, 8.4v, 9.6v.....	\$6.50	\$5.50
DC-2 Rapid Discharger w/Heatsink (can discharge all cells up to 9.6v).....	\$28.50	\$26.50
DC-3 Tx Ni-Cad Discharger (slow discharge cells safely) Includes LED Indicators.....	\$4.95	\$3.50
DC-4 Rx Ni-Cad Discharger (slow discharge cells safely) Includes LED Indicators.....	\$4.95	\$3.50
240v Mains Tx/Rx Dual Output Charger.....	\$44.50	\$38.50
240v Mains 7.2v Quick Charger.....	\$69.95	\$65.50
12v Timer 7.2v Quick Charger.....	\$49.95	\$38.50
12v Max II Peak Fet Charger (for all Ni-Cad packs variable 0-6.5 amp).....	\$119.50	\$109.50
12v Challenger Digital Readout Peak Fet Charger (variable 0-10 amp) for all Ni-Cad packs.....	\$255.00	\$225.00
12v Tx/Rx Dual Output Peak Charger.....	\$119.50	\$109.50
Battery Hook-Up Wire 3mm W 1m Long.....	\$5.95	\$4.50
Battery Hook-Up Braid 10mm W 1m Long.....	\$4.95	\$4.50
Supreme Soldering Fluid Fast Flux.....	\$6.95	\$5.50
Silicon Wire Heavy Duty Multi Strand Super Flexible 14AG Hi-Current Capacity (red or black) metre.....	\$8.50	\$7.95
Silicon Wire Standard Multi Strand Super Flexible 16AG Hi-Current Capacity (red or black) metre.....	\$5.50	\$4.95

RADIO CONTROL GEAR & ACCESSORIES

Sanwa Dash R2 2 Channel.....	\$129.50	\$99.50
Technisport Wheel Radio 2 Channel.....	\$129.50	\$109.50
KO EX 1 Wheel Radio 2 Channel.....	\$395.00	\$365.00
Sanwa Vanguard 4 Channel Mini Rx.....	\$295.00	\$249.00
Sanwa FM5H 5 Channel w/5 Servo.....	\$695.00	\$595.00
Mini 2 Channel Rx 29 mhz.....	\$149.50	\$139.50
STD 2 Channel Rx 29 mhz.....	\$59.50	\$49.50
Mini 3 Channel Rx 29 mhz.....	\$159.50	\$139.50

Futaba S1305 Servo Hi-Torque Mini.....	\$89.50	\$79.50
HW R110 On-Board Battery Monitor.....	\$59.50	\$48.50
Tx Radio Neck Strap.....	\$18.50	\$16.50

ELECTRONIC SPEED CONTROLLERS

Suitable for Electric Aircraft, Boats, Buggies, Helicopters etc		
Novak T4 100-300 amp Capacity.....	\$185.50	\$175.50
Novak T1 250-500 amp Capacity.....	\$295.00	\$255.00
Novak T1-X 500-2000 amp Capacity.....	\$355.00	\$325.00
KO CX-III w/Reverse 100-300 amp Capacity.....	\$199.00	\$179.00
Traxxas XL2 250-500 amp Capacity.....	\$139.50	\$119.50
Traxxas XL1 w/Reverse 150-300 amp.....	\$119.50	\$109.50
Speedmaster w/Reverse 75-150 amps Capacity.....	\$129.50	\$99.50
Speedmaster 12v w/Reverse 75-300 amps.....	\$149.50	\$139.50
Purge Force 100-300 amp Capacity.....	\$295.00	\$275.00

SERVO GEARS/SERVO LEADS SERVO HORNS/SCREWS/RUBBER MOUNTS/FERRELS FITTINGS/MOUNTS/TX AERIALS ETC ALL THE RADIO ACCESSORIES YOU'LL EVER NEED

HELICOPTER KITS & ACCESSORIES

Attacker Cyclone Helicopter 50/60 size.....	\$795.00	\$695.00
Hirobo Shuttle STD w/32H Engine.....	\$845.00	\$795.00
Hirobo Shuttle Zx w/32H Engine.....	\$1,095.00	\$995.00
Hirobo MH10 w/CZ10 Engine.....	\$795.00	\$695.00
The Complete Helicopter Manual, by Roy Hostettler.....	\$36.50	
Flying Model Helicopters, by David Day.....	\$29.95	

FIBREGLASS CANOPIES

w/Screens & Fasteners Yellow/Orange/White		
20 size.....	\$64.50	\$58.50
50/60 size.....	\$69.50	\$59.50
Airwolf 50/60 size.....	\$325.00	\$295.00
Bell 222 50/60 size.....	\$325.00	\$295.00
Augusta 109A 50/60 size.....	\$325.00	\$295.00
Bell Jetranger 50/60 size.....	\$325.00	\$295.00
Hughes 500E 20/35 size.....	\$275.00	\$225.00
Jetranger 20/35 size.....	\$275.00	\$225.00
Squirrel (Ecuriel) 20/35 size.....	\$275.00	\$225.00
All Fuselages include Screens/Templates/Plans/Instructions		

Shuttle MRB Wooden.....	\$39.50	\$29.50
Shuttle MRB Wooden Weighted.....	\$39.50	\$29.50
Concept MRB Wooden Weighted.....	\$39.50	\$29.50
50/60 MRB Wooden Weighted		
12mm or 14mm Blade Root.....	\$59.50	\$49.50
Ultralight Nylolc 3mm (pkt 10).....	\$4.50	\$3.95
Ultralight Nylolc 4mm (pkt 10).....	\$4.50	\$3.95
Stainless Steel Screen Mesh 250 x 300mm.....	\$6.50	\$5.50

STAINLESS STEEL CENTRIFUGAL CLUTCHES

B20.....	\$76.50	\$59.50
B20MX.....	\$76.50	\$59.50
Shuttle w/Pulley.....	\$79.50	\$59.50
B50/60.....	\$79.50	\$59.50
555/888.....	\$79.50	\$59.50
Clutch Lining 20-45 size.....	\$3.50	\$2.45
Clutch Lining 50-60 size.....	\$5.95	\$4.50
Training Flybar Paddles (48 gms each).....	\$36.50	\$26.50
Float Sets 20/40 size.....	\$59.50	\$49.50
Float Sets 50/60 size.....	\$69.50	\$59.50

CARBURETTOR ARM XTENSIONS

Plastic.....	\$4.50	\$3.50
Steel.....	\$9.50	\$7.50

MODEL BOATS & ACCESSORIES

Skegs, Rudders, Flex Shafts, Flex Hex Couplers, Engine Mounts, Rubber Mounts, and much, much more . . .

HULLS

Lazer 2.5-7.5cc Award Winning Multi.....	\$155.00	\$125.00
Vantage 7.5-9.5cc Multi Deep Vee.....	\$159.00	\$129.00
Proton Elec. or 1.5cc.....	\$129.00	\$99.50
Villain IV Twin Electric 05.....	\$350.00	\$325.00
Viper Electric Canard.....	\$149.50	\$99.50
Fast Cat Twin Electric Tunnel Hydro w/Motors.....	\$295.00	\$225.00
Python 3.5-7.5cc Canard.....	\$225.00	\$185.00

COMING SOON OUTRIGGER HYDRO 3.5-7.5CC FIBREGLASS CONSTRUCTION WITH ALL RUNNING GEAR ALL YOU NEED IS MOTOR AND RADIO

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#1702 11 Turn Double Wind.....	\$129.50
#1703 12 Turn Double Wind.....	\$129.50
#1704 13 Turn Double Wind.....	\$129.50
#1705 14 Turn Double Wind.....	\$129.50
#1706 15 Turn Double Wind.....	\$129.50
#1707 16 Turn Double Wind.....	\$129.50
#1708 17 Turn Double Wind.....	\$129.50
#1709 18 Turn Double Wind.....	\$129.50
#1710 19 Turn Double Wind.....	\$129.50
#1711 20 Turn Double Wind.....	\$129.50

#2030 Twin Motors for Fast Electric Boats 16 Turn Double (pair).....	\$159.50
#002 16 Turn Double.....	\$59.95
#003 18 Turn Double.....	\$59.95

REPLACEMENT ARMATURES

	RRP	SALE
#3030 9T DOUBLE FOR #1700.....	\$56.50	\$49.50
#3013 10T DOUBLE FOR #1701.....	\$56.50	\$49.50
#3021 11T DOUBLE FOR #1702.....	\$56.50	\$49.50
#3022 12T DOUBLE FOR #1703.....	\$56.50	\$49.50
#3010 13T DOUBLE FOR #1704.....	\$56.50	\$49.50
#3009 14T DOUBLE FOR #1705.....	\$56.50	\$49.50
#3006 15T DOUBLE FOR #1706.....	\$56.50	\$49.50
#3014 16T DOUBLE FOR #1707.....	\$56.50	\$49.50
#3016 17T DOUBLE.....	\$56.50	\$49.50
#3008 18T DOUBLE FOR #1709.....	\$56.50	\$49.50
#3007 19T DOUBLE FOR #1710.....	\$56.50	\$49.50
#3031 20T DOUBLE FOR #1711.....	\$56.50	\$49.50
#3032 13T TRIPLE.....	\$56.50	\$49.50
#3033 14T TRIPLE.....	\$56.50	\$49.50
#3034 15T TRIPLE.....	\$56.50	\$49.50
#3035 16T TRIPLE.....	\$56.50	\$49.50
#3036 17T TRIPLE.....	\$56.50	\$49.50
#3037 14T QUAD.....	\$56.50	\$49.50
#3038 15T QUAD.....	\$56.50	\$49.50
#3039 16T QUAD.....	\$56.50	\$49.50

MOTOR ACCESSORIES

	RRP	SALE
#4006 CUT BRUSHES pair.....	\$9.50	\$6.95
#4007 TIMED BRUSHES pair.....	\$9.50	\$7.50
#4035 CUT BRUSHES OFFROAD pair.....	\$9.50	\$7.50
#4038 NEW HARD BRUSHES pair.....	\$8.50	\$6.95
#4033 HEAVY MOTOR SPRINGS pair.....	\$3.95	\$2.95
#4032 LIGHT MOTOR SPRINGS pair.....	\$3.95	\$2.95
#4028 MEDIUM MOTOR SPRINGS pair.....	\$3.95	\$2.95
#4016 ENDBELL COMPOSITE.....	\$39.50	\$35.50
#4018 ENDBELL ALUMINIUM.....	\$44.50	\$39.50
#4041 WET MAGNET CAN.....	\$39.50	\$36.50
#4030 BEARING SETTING TOOL.....	\$26.50	\$22.50
#4027 STEEL MOTOR SHIMS.....	\$3.50	\$2.95
#4044 TIMING RING AND SCREWS.....	\$4.50	\$3.50
#4060 COMMUTATOR CLEANING STICK.....	\$10.50	\$7.50
#4061 COMMUTATOR POLISHING STICK.....	\$10.50	\$7.50
#4036 FOAM MOTOR DUST COVER.....	\$3.95	\$2.95
#7039 SILICONE SHOCK SEALS.....	\$3.95	\$2.95
#4103 DUAL SLOTTED BRUSHES FOR HIGH AMP DRAW		

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51T Tasco 75 Power w/Tripod.....	\$109.50	\$96.50
51TR Tasco 75 x 50 x 117 w/Tripod.....	\$109.50	\$96.50
53T Tasco 40 x 40 w/Tripod.....	\$79.50	\$69.50
44TR Tasco 30 x 90 x 60 w/Tripod.....	\$295.00	\$245.00

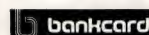
MICROSCOPES

M900ZF 5 Way Microscope 900x Illuminated.....	\$129.50	\$109.50
P100 Basic Microscope 100x.....	\$19.50	\$16.50
Slide Making Kits w/Specimens.....	\$28.50	\$24.50

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**WELL, IF YOU THINK WE
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PHONE US, OR COME IN AND SEE
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RADIO CONTROL AIRCRAFT QUESTIONS & ANSWERS PETER SMOOTHY

Radio Control Aircraft. Questions and Answers by Peter Smoothy
Radio Control Handbooks, published by Argus Books, Boundary Way, Hemel Hempstead, Herts, HP2 7ST, England. Price £6.95 Sterling, plus 10% for packaging and postage.

This book provides the best reading of the RC Handbooks series. Peter Smoothy has been conducting the Hot Line for Radio Modeller, a phone-in advice service for aeromodelers. The idea was immediately successful and continues to be a favourite feature of Radio Modeller magazine.

Every modeller will learn something from this book some that was unknown before, which gives it unique value. Even if the newcomer to modelling has most to gain from reading the questions and answers, experienced modellers will read them to see if their answers agree with Smoothy's.

There are six sections in the book: building, covering, radio gear, engines, flying and general. None is complete; all are interesting. Illustrations are infrequent but good. There are questions unasked in this book, so if you want an answer to a special query, ask Mr. Smoothy. No modeller knows everything, but this handbook is great value, for the individual or for group discussions.

OG

Flying Radio Control Gliders;

by George Stringwell.

Published by Argus Books, Argus House, Boundary Way, Hemel Hempstead, Herts, HP2 7ST, England.

Price £4.95 (Sterling) + 50p for P&P.

Once again Argus have produced an excellent book for the beginner who wants to take up the building and/or flying of radio control model gliders. This book takes the reader from the beginning, with a desire to build or fly a model glider, through the various steps up to the basic techniques of both slope and thermal soaring.

At no time does the author confuse the reader with mathematical formulae or involved discussions on aerodynamics. He grew up with free flight gliders, and his experience covers the whole range from chuckies to full-size. Not only does he understand them, he is able to pass on the information with authority, while keeping the reader comfortable with his learning.

He very carefully lays the groundwork for the selection of the right type of model to suit the particular requirements of the beginner, and then leads him or her through the resulting stages.

His explanations and descriptions are complemented by excellent sketches and diagrams, and the resultant book is easy to read and understand. If you have just started in radio control gliding, or are contemplating doing so, then I can thoroughly recommend this book as a very good basic manual.

B.A.

COMPUTER SOFTWARE

The Sailplane Design 3 computer program by David Fraser, one of the Princeton research team, is advertised as incorporating all the Princeton tests and others, and comes together with a 49 page user's manual. It is intended for the IBM PC, XT, AT, PS/2 or clones. The cost is US\$37 for overseas orders. This writer has ordered a copy and the disc. If this program does all that is claimed, it should be an important advance. Sailplane Design 3 Software is available from David B. Fraser, 1335 Slayton Drive, Maple Glen, PA, 19002, USA.

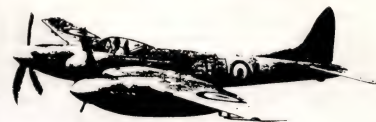
TRADE NOTES



Now available from Model Engines, a new ARF by OS, which includes the latest Max 25 SF ABC engine. Aircraft has plastic finish and plastic components with some balsa structure. Expected retail price, with engine, no radio, is \$395. Ring (03) 429 2925 for further details.

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The worlds leading model engine mufflers and pipes. The mufflers that all others are judged by. It is a proven fact; the SOUNDMASTER Muffler design causes NO POWER LOSS, and in fact, in most cases increases power over stock mufflers.

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- Allows easy thrust line adjustment.
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- Installs in minutes with no special tools required.

Misor — for engines up to .90

Misoj — for engines 1.0 to 4.2 cu. in.

DAVIS DIESEL HEAD CONVERSIONS

Do you have a 2-stroke glow engine that just doesn't seem to fly your model with any authority, even though it is in good shape; and can't afford the dollars for that larger engine, which wouldn't fit in your present model in any case? Convert that present 2-stroke glow to diesel with a Davis Diesel head conversion, for more economical flying.

No more failed glow-plugs, no more batteries to cart around, easy to start, smooth running and quieter; with an increase in performance that is awesome.

FACT: A dieselized O.S. .90 will swing an 18/6 at just under 7500 R.P.M. and will only consume 1/2oz. fuel/minute doing it. (20 minutes on a 10oz. tank) 'bye-bye chain saw engines!

FACT: A dieselized O.S. .25 will swing an 11/6 at about 10,000 R.P.M. and will only consume 1/5oz. fuel/minute doing it. (20 minutes on a 4oz. tank) that's the power to weight of AT LEAST a .40.

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The best running and safest diesel fuel and concentrates for your engines that you could use. In four different blendings for all diesel engines.

- 1/2A FUEL — for .049 to M10, antiques and foreign diesels.
- STD. CONCENTRATE — for .15 to .40 plain bearings.
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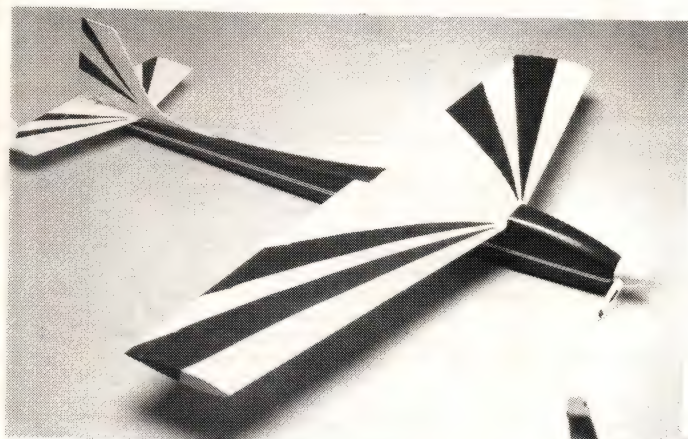
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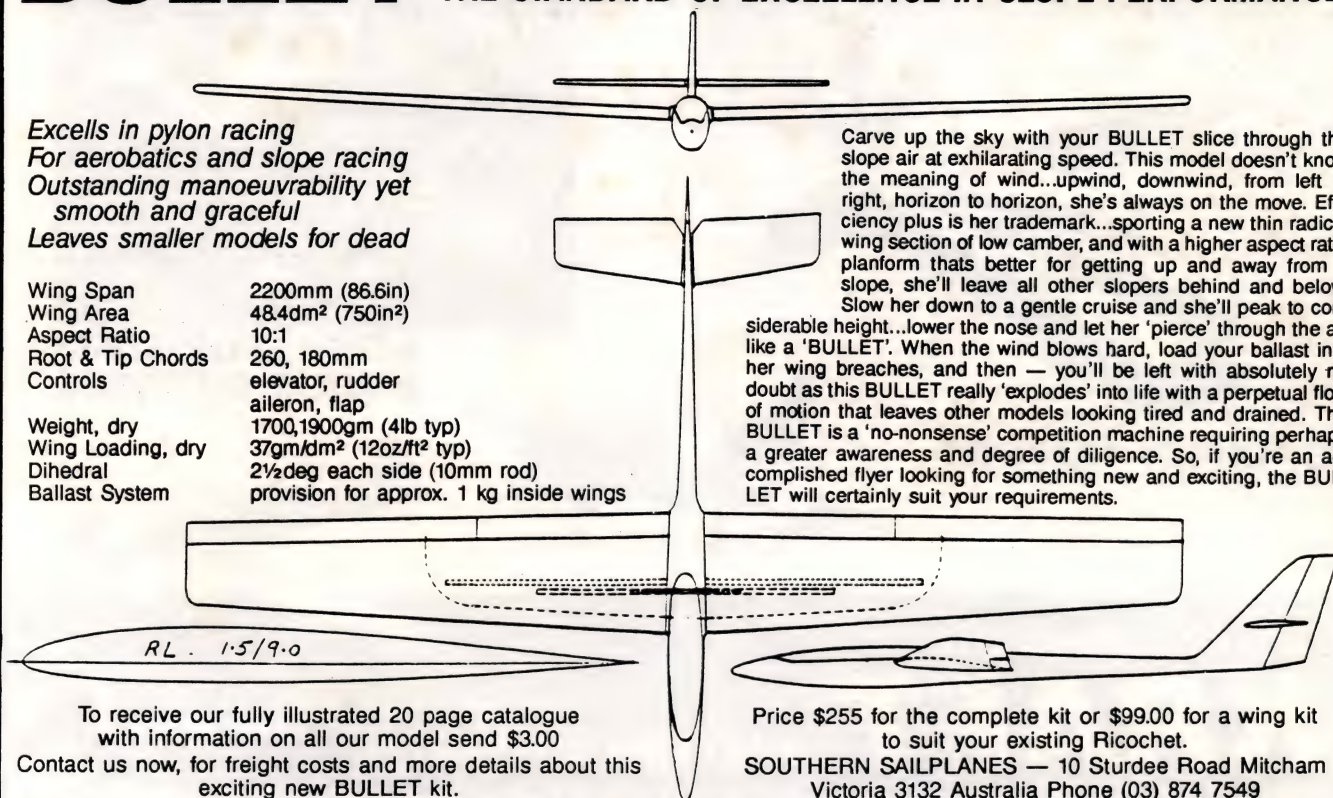
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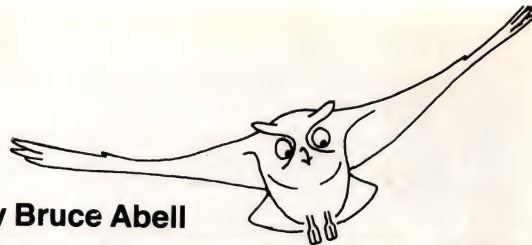
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ON SILENT WINGS

by Bruce Abell



SOURCES

The notes about the Girsberger aerofoils in recent issues were taken partly from Aspectivity, the VARMS newsletter, which took most of the material from Soartech edited by Heck Stokeley. Further comments by Martin Simons were considerably helpful. It is proper to credit the sources, but the information is what matters most. Further items are always welcome, even if the source is A. Nonny Mous!

NO SPLAT FOR ME

Having read in the LSF newsletter Martin Simons' comments about "The Splat Landing Question", I think that the issue deserves much wider circulation so as to get enough discussion and a true consensus of opinion on this contentious issue.

My own thoughts are in total agreement with the sentiments expressed by both Martin and Max Kroger. After all, are we competing in flying or in landing contests? Send your comments to Mal Pring, 39 Clifford Way, Valley View, SA, 5093.

By the way, the comments in No. 97 were by the Editor, not this columnist. *Yep! Should have been in italic!*

GETTING LAUNCHED

To finish off my discussion on winch construction, I thought I'd briefly describe my current method of making the drum and a bit of the design philosophy behind it.

Before you start to make your drum you must decide what kind of launch you want for your glider, and by this I mean, do you want a soft or a hard launch? For example, if the diameter of the drum (where the line winds on) is small, say 50 mm, it would have to do a lot more revolutions than one twice that diameter before there was sufficient tension on the line to launch the glider. Consequently, the winch is more forgiving of a heavy foot on the drive switch, and this is what I call a soft launch because it is less jerky as the switch is pulsed on and off.

On the other hand, the large diameter drum builds up line speed very fast and is thus a hard launch, which is necessary for the big, heavy models. I have found that about 75 mm seems to be a fairly good all-round figure, but the ideal, of course, is to have two different sized drums that can be readily interchanged. In Airborne No. 96 there was a sketch of how to set up a quickly removable drum, and the photo in this issue shows the component parts of the drum, prior to them being assembled on a mandrel and welded together. It is **absolutely essential** that they be firmly bolted together on a mandrel for



Later winch drum design using 75 mm nominal bore pipe and 3 mm sheet flanges all in steel. Needs proper cleaning and galvanising after welding. Nickel plating perhaps? Or chrome!

welding, otherwise they won't slide onto the motor shaft afterwards!

After welding together, the mandrel and drum have to be mounted in the lathe and machined all over to trim rough weld and to ensure that the drum runs true. The biggest problem here is where the boss for the bike sprocket is welded to the end of the drum. The weld has to be machined back to allow the sprocket to screw on against the end of the drum (or a spacer washer) without removing too much of the weld and weakening it. This is not difficult for anyone with a bit of lathe experience, and makes for a very sturdy, light and compact drum.

If you do contemplate making your own winch, I strongly recommend keeping it fairly basic first up and adding the refinements (like remote switching and automatic tensioning) at a later date. If you run into any problems, an SASE to me will get you a prompt answer.

MAKING IT ACROSS COUNTRY

A comment on longitudinal stability made by Max Chernoff in a letter to RC Soaring Digest prompts a few thoughts on that subject that are pertinent to the design requirements for cross-country RC gliders. If the model has neutral stability it will have to be flown continually by the pilot, as it will always want to continue to fly in whatever attitude it assumes after being disturbed until forced into a further change, either by control input by the pilot or atmospheric turbulence. Consequently we design our models with a reasonable amount of stability so that the pilot has to use his controls to change direction or attitude only occasionally.

If this stability is taken to the extreme, the model's response to control inputs is very slow, as is its response to air turbulence, thermals in

particular. So, on the one hand we have our model with neutral stability which responds instantly to all changes in air conditions, giving lots of visual signals to the pilot in the process, while on the other hand we have our super-stable model that floats on almost regardless of changes in the air conditions, and giving very few visual signals to the pilot.

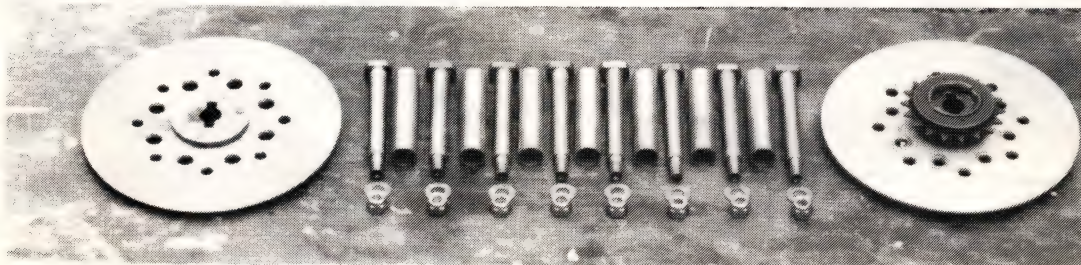
The normal (?) thermal glider has to be designed so as to have reasonable stability yet give good visual signals to the pilot and have reasonable response to control input. On the other hand, the cross-country model needs more stability for two major reasons:

1. Frequent control inputs from the pilot over a long period can be very tiring due to the concentration required to keep the model in a good flying attitude.
2. At some stages during the course the model will be out of sight for a period due to trees or other obstructions, and it is essential that the model should continue on its course during this period so that the pilot will know where to look for it when he emerges from behind the obstacle.

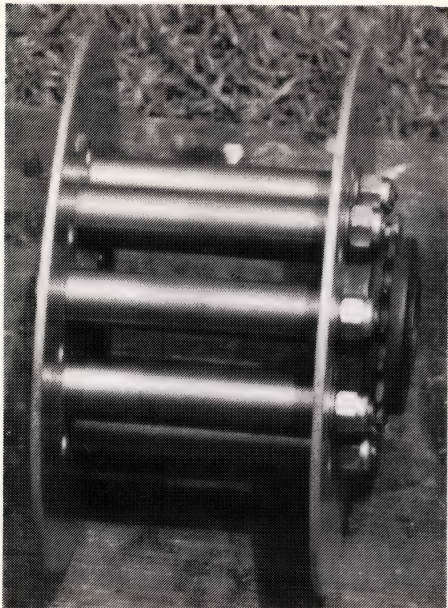
So what are the criteria for a suitable cross-country model? Polyhedral wings would appear to be the best choice for lateral stability, with the angles slightly greater than for a normal (?) thermal glider. For increased longitudinal stability the tail moment should be increased by at least 10% over that needed for normal thermal flying.

With these changes as a basis to start from, we can develop a cross-country model that will not tax the concentration of the pilot too much, will maintain its heading and attitude for reasonably long periods and can readily be parked in an orbit by setting the Tx trims.

For reasons of visibility and efficiency, the cross country glider is large, with only moderate



Components of winch drum ready for assembly. 12 mm coach bolts have sleeves that act as spacers to set drum flanges at correct distance apart. Each lock nut has a washer.



Winch drum assembled ready for welding. When welding is complete and drum is trued on lathe, bolts are removed.

aspect ratio. Furthermore, it has to be strong to cope with high gliding speeds and the turbulence often encountered at higher than usual speeds. To fly at speed requires a wing loading well above that of the thermal glider. The extra mass and size also contribute towards better stability.

It has been considered by several cross-country pilots that efficiency should be improved by adding winglets or tip sails to a glider's wing. However, it should be pointed out that these devices function properly at only one angle of attack, which is appropriate for transport aircraft that fly in straight lines and do not indulge in anything but the slightest changes in pitch. With

model gliders the bank angles and pitch angles are changing continually, over quite a wide range, probably rendering winglets almost valueless, since the benefits gained when straight and level would be more than nullified by the extra drag when they were unable to function properly.

ARE SLOPE SOARERSSOARING OR SNORING? from Colin Felmingham

Prior to receiving Airborne No. 96 in the mail I introduced a flying buddy, Steve, to the joys of slope soaring, and we discussed the apparent low profile that seems to have been adopted by Australian ridge riders compared with that seen in the UK magazines. Everything seems to be covered there, including pylon, scale, power scale, aerobatics and cross-country. Perhaps a direct parallel cannot be made. There are differences in population, weather conditions and geography that may appear to make it more popular there. However, I do get a tinge of envy when I see the range of aircraft kitted out as slope soarers on offer.

Then, to my surprise and delight, a number of articles in No. 96 made reference to the art of sloping. Bruce Abell gave it a mention, and I agree that sloping popularity should soar, and I am a bit surprised at its continued low profile. Then Martin Simons wrapped it up nicely in his Flight Analysis column in such a way that I feel that anyone who read it (and who wouldn't?) is probably off to the slopes right now.

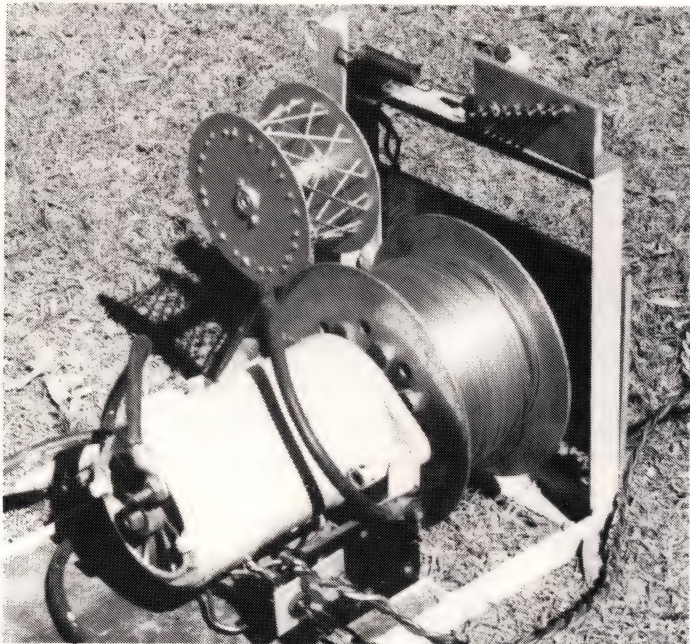
Why, however does this low profile exist? When I was living in Cairns sloping had a humble following of a few dedicated ones but it increased to a point where a dozen or so aircraft could be seen at a time. What happened? The low profile went high because we flew on a hill right on the southern outskirts of the town. Most people are probably awed and fascinated by model flying. If people get to see it their brain starts imagining and their fingers start twitching to give it a go. That is, if they get to **see it**.



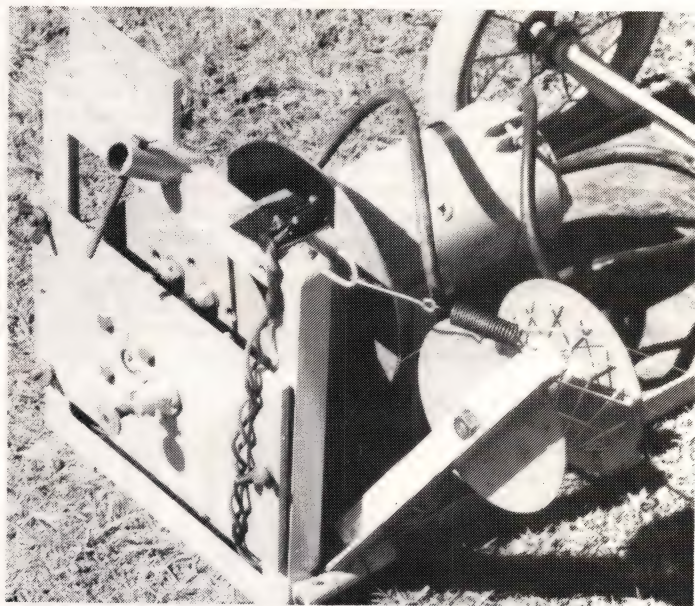
This winch drum has 3/4 mild steel bolts with aluminium tubing spacers. The force of multiple strands wound onto the drum while the line was under tension has bent the bolts! Abell photo.

The usual ridge is probably too isolated for happenstance sightseeing. This is also true for power models. Our flying fields, due to noise, are often far removed from the casual observer. Thermal soaring is also most likely out in the back paddock of a friendly farmer. Could this be one reason for the lack of newcomers?

Back to sloping though. My mate and I live in Ceduna, SA., and we found a nice hill on the coast just west of here. Steve is now sold. Even his humble Super Trident penetrates the strongest sea breeze; and they get very strong. He delights in one and a half hour flights, and scoffs at the mention of bungees and thermals. We entice a local sea eagle up for sorties, and I feel sure that the eagle enjoys it as much as we do. Which of us has the biggest wingspan is still uncertain.



The columnist's winch fitted with automatic tensioner. Micro switch on top corner of frame, behind spring, is wired in the open position. When line tension overcomes spring tension the arm is pulled forward, throwing the solenoid into open circuit. Adjustment is by repositioning the spring hook on the row of bolts.



Rear view of the Abell winch showing micro switch for automatic tensioner. Wire spoked drum on right is towline guide, hinged to bottom of frame.

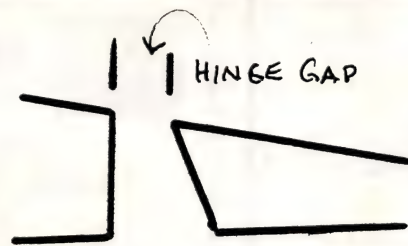
And what a green sport! All solar powered except for our batteries, and that will probably come in the not too distant future. The flying can be as exciting, particularly with rocks and the great Southern Ocean below, or as relaxing as you care for, depending on your model and aggression on the day. The main thing to suffer is your landing ability. With only one landing necessary per outing your ability to hit the spot may get a bit doubtful, although you can have as many rounds as you like. Whenever there is a breeze a good session can be had, so remove that engine, shift the battery pack and go find a friendly-looking hill. Let's hear from this hidden faction of flying in Australia.

OK you slopers, as Colin calls you. This is your journal, so tell Bruce Abell bout your models and slope sites. He is at 17 Ferguson Street, Cessnock, NSW, 2325. SASE for return of any photos, please, or if a reply is required.

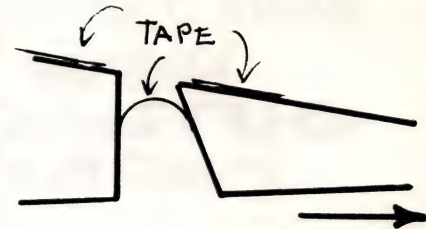
BACK TO THE PAST

Now for an update on the development of the AIRBORNE 88er. For years before the 88er was ever put on paper I thought about putting flaps and ailerons on a glider and, to this end, long ago I bought a special plug-in mixer for my Tx. This mixer will enable me to have full-span flaps and tip panel flaperons, coupled ailerons and rudder with differential ailerons. I had to do a lot of thinking about the set-up before taking what was, for me, such a quantum leap.

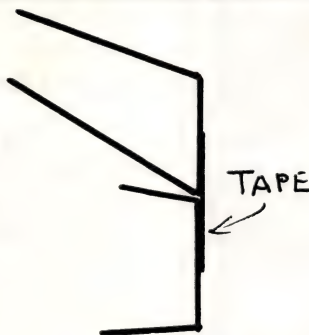
One of the main stumbling blocks was developing a suitable hinge that would have the undersurface of the wing unbroken, **completely** seal the hinge gap and allow at least 75° of movement. This is a fairly tall order, but the wing panels are now built and the control surfaces ready to be fitted. An article in RC Soaring Digest showed that by sealing the balsa where necessary with cyano-acrylate, sanding it smooth, using masking tape for the masking and forming and then using silicone auto and caravan sealant (others would probably do), I can now produce a hinge that meets all my requirements. The following is a reproduction of Harold Blettner's system as it appeared in the February 1989 issue of RC Soaring Digest.



Finish wing and aileron. Provide 1.5 mm gap between them along hinge line. Surface for silicone should be sealed and smooth.



Pull aileron from wing to re-establish 1.5 mm gap. Tape sags below wing top surface while still attached to wing and aileron. Place tape on top of wing and aileron along hinge line almost to edge of gap.



Attach aileron to wing with low tack adhesive tape, as for IOF hinge.



When all components are in correct position to ensure proper wing-aileron profile, fill gap with silicone sealer and smooth top surface with spatula.

Remove top tape before silicone sets. Remove bottom tape after silicone sets.



Lower aileron to normal position, although it is too close to wing.



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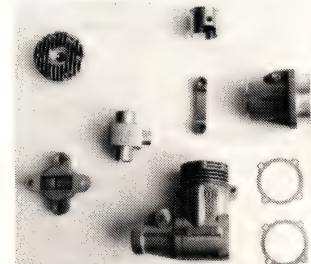
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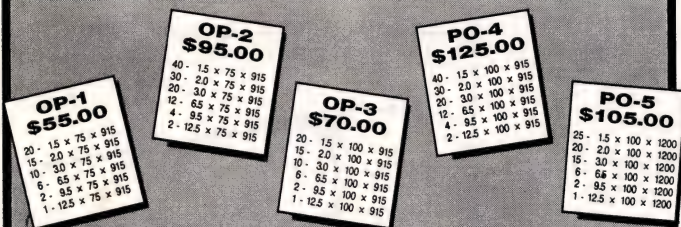
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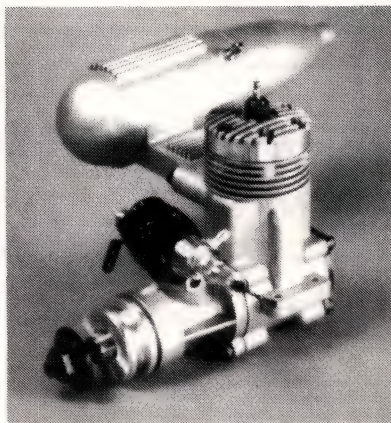
IRVINE 46RC

Irvine has developed a new 46 RC to complement their range of popular mid-size sport engines. Owners of existing Irvine 40 will be able to give more 'oomph' to their models by using the new IRVINE 46 in its place. The extra 17% capacity from the boring and stroking exercise, together with improved porting have increased useful torque levels by some 25% in the lower RPM area for RC sports use.

Test conducted by Mike Billington (Radio Control Model World) with standard silencer and 5% nitro fuel, shows improved RPM figures with standard props:

14x7 Graupner	6,920 rpm
13x6 MK	8,960 rpm
12x6 Graupner	10,440 rpm
11x6 Graupner	11,710 rpm
10x6 MK	12,830 rpm
10x4 Zinger	15,079 rpm
9x4 Zinger	17,853 rpm
(Standard Silencer/5% Nitro)	

Maximum BHP (open exhaust) recorded is 1.31, with a Maximum Torque of 96 oz.in. All in all, a very creditable performance and a fine advance on Irvine's much respected Mark II 40.



A solid aluminium body carburettor is provided with the IRVINE 46. The new 'Jetstream' RC carburettor is an all metal assembly comprising anodised black, solid machined aluminium alloy main body, machined brass jet assembly, machined and polished steel barrel, and steel needle valve and throttle arm.

Check out this fine new IRVINE 46 at your nearest hobby shop.

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IRVINE 20 BLACKHEAD Stunt	SE, FI
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IRVINE 21R ABC Speed w/Spinner	RE, FI
IRVINE 25 Stunt	SE, FI
IRVINE 25 BLACKHEAD Stunt	SE, FI
IRVINE 30 Stunt	SE, FI
IRVINE 40 Stunt	SE, FI
IRVINE 40 Speed w/o muffler	SE, RD

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IRVINE 20 BLACKHEAD R/C	SE, FI
IRVINE 20 ABC R/C	SE, FI
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IRVINE 25 Helicopter	SE, FI
IRVINE 30 R/C	SE, FI
IRVINE 40 R/C	SE, FI
IRVINE 40 Speed R/C	SE, RD
IRVINE 40R R/C	RE, FI
IRVINE 40 ABC R/C	SE, FI
IRVINE 61 R/C	SE, FI
IRVINE 61R R/C	RE, FI
IRVINE 61R R/C w/piped liner	RE, FI
IRVINE 61 ABC R/C	SE, FI

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IRVINE 20 ABC Marine	SE, FI
IRVINE 21R ABC w/o Flywheel	RE, FI
IRVINE 25 Marine	SE, FI
IRVINE 40 Marine	SE, FI
IRVINE 40 ABC Marine	SE, FI
IRVINE 40R ABC Marine	RE, FI
IRVINE 40 ABC Marine	FE, FI
IRVINE 61 Marine	SE, FI
IRVINE 61R Marine	RE, FI

IRVINE 20 Car	SE, FI
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IRVINE AE15 1.5 cc Diesel	

41. WIND AND WEATHER (5)

THERMALS

A famous meteorologist, Walter Georgii, in the nineteen twenties declared in print that thermal convection currents, strong and large enough to carry up man-carrying gliders, did not exist. Thermals were strictly for the birds, he thought, but did not consider model aeroplanes. To his credit, Professor Georgii quickly proved himself to be wrong, and subsequently took a leading role in the development of thermal soaring. It is wise for model glider flyers to realise that thermals are not usually small and feeble, but, more often than not, are capable of carrying up a full-sized sailplane weighing, with pilot, upwards of 300 kg, and very possibly loaded with water ballast too. Convection currents in the air, once thought to be feeble and rare, are often powerful, and are very common indeed.

If any light and heat energy from the sun reaches the ground, as it does on even the gloomiest day, there will be some warming of the air from below, and this heat must be dispersed to higher levels by some means. The most usual method is by convection stirring; i.e. thermal currents. Even after a cold front brings a cool change of air mass to a district, the ground retains some warmth, and heating of the air from below continues. Rain, which cools the ground, spoils convection, at least while the ground remains wet and chilly, but very frequently showers fall from cumulus clouds, which are themselves created by rising thermal currents. In this case, while the particular area on the ground where the latest shower fell may be unproductive, the clouds still mark the continuation of convection. A cumulus cloud forming is a sure sign that a strong thermal, or thermals, exist and the lift continues into the cloud.

Unfortunately for model flyers, it is very difficult, from the ground, to position a model glider in the best place relative to a particular good-looking cloud to find the thermal that creates it, even when nice fat cumulus clouds are directly overhead. As will be explained below, thermals are not simple columns of air pouring up from the ground into the clouds. Often the thermal producing a particular fat cloud is too faraway to be reached, but the existence of cumulus does at least indicate that strong convection is going on, and thermals must be available. There are

also, especially in Australia and other dry countries, many days when good thermals exist but have no clouds to mark them. These are sometimes called blue thermals, indicating that they are found under cloudless skies. (It would be too easy to catch them if thermals were really coloured in some distinctive fashion.)

Convection occurs even on frosty days. Air which is at freezing point may still be warmer than that a few metres above the ground, and convection must then take place. Strong winds may tend to break up thermals and make them turbulent, but they will still be there and usable by the glider pilot. Once all these facts are realised, it becomes a cause for comment when thermals cannot be found, rather than the other way round. Model glider pilots who **expect** to find thermals usually do, because they are usually present.

The Inversion Again

The importance of the usual early morning air temperature inversion has been explained before, and this places an effective lid on thermals. Air in a thermal does not remain at the same temperature as it rises, but cools. It will continue to rise only so long as it remains a little warmer than the surrounding air, which also cools with altitude unless there is a temperature inversion. (A cumulus cloud is, in fact, composed of water droplets which have condensed from the air in a thermal as it rises and cools.)

Early in the day a temperature inversion almost always exists low down. Convection currents that cease at a height of only ten to twenty metres are not of much value to the glider pilot, and this often occurs early in the morning. As the ground warms, the level of the inversion rises, and eventually will break altogether. It is found that thermals are related in size and strength to the depth of the convection layer; that is, to the height of the inversion (Figure 41.1). When the lid is only 30 to 50 metres above the ground, thermals tend to be very numerous but too small, as a rule, to be useful. Hand-launched free flight and very small radio controlled gliders can occasionally soar in such small currents, but the inversion prevents much height being gained. The areas of sinking air between thermals also tend to be small and frequent.

As the height available for upward growth in-

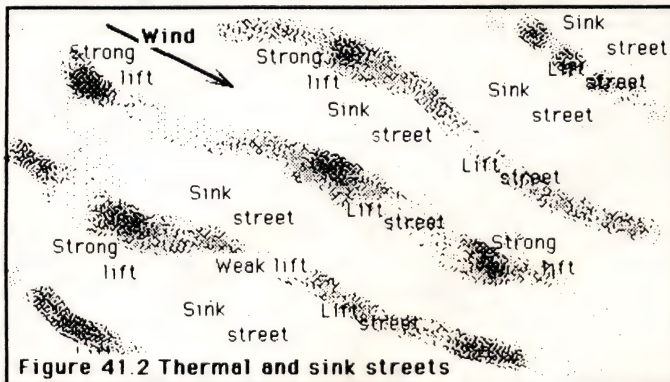
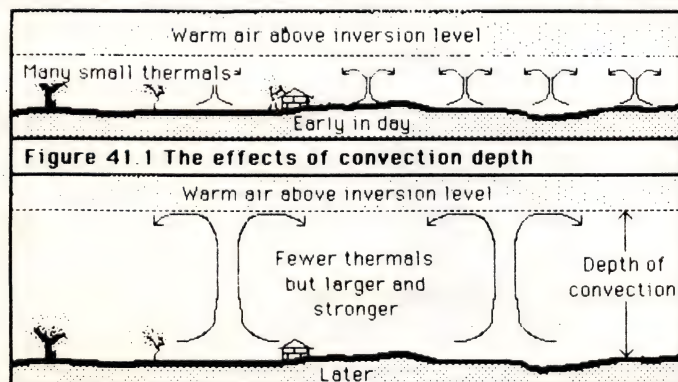
creases, the thermals go higher and tend also to become wider and stronger, but they are less frequent. The same applies to the intervening down currents. When the inversion has broken entirely, very large and strong thermals can develop to great heights but, accordingly, they are further apart still, and correspondingly large downdrafts exist between them. Model glider pilots thus often find their most relaxed soaring occurs in mid morning when thermals are frequent and close enough together to give a good chance of finding them, but do not go so high that the model is in danger of being lost. Later on, although each individual thermal may be quite powerful and take a model up quickly to great heights, finding the next one may involve searching for long distances and navigating through equally powerful sink areas.

The Size of Thermals

A typical full-sized sailplane might span between 15 and 20 metres, and can circle steeply banked, without ballast, at a radius of about 60 metres. With less bank and more ballast the radius of turn is a good deal greater, perhaps 100 metres. This suggests that a minimum usable thermal for such an aircraft would have a **core** diameter of about 120 to 200 metres. To give a standard of comparison, this is somewhat larger than the dimensions of a football oval, and represents, as stated, about the smallest thermal usable by a modern man-carrying sailplane.

The core is mentioned because, as will be explained below, the thermal as a whole is a complex structure. The core is that part of the upcurrent that is rising fastest. Outside the core, for a radius all round of perhaps as much again, is an area where a glider will feel some of the effects of the thermal, often in the form of turbulence or weak and broken lift. This does not necessarily mean that usable lift is so widespread, but the thermal does give an indication of its existence over quite a large region.

Very near the ground, and early, under an inversion, a thermal is likely to be small and hard to use. Even so, a model sailplane, even a relatively heavy one, can circle with a much smaller radius than its full-sized counterpart. Without banking steeply, even a heavily ballasted model sailplane should be able to circle easily within a 40 metres diameter thermal core. As a thermal



FLIGHT ANALYSIS

risers it tends to expand to larger diameters, so models rarely need to circle very tightly once the thermal has been found and centred. Since turning a glider creates drag and hence increases the rate of sink, the best rate of climb in a thermal is usually achieved by circling gently with the appropriately moderate angle of bank, within the core.

It is a matter of experience among pilots of full-sized gliders that once the morning inversion has been broken, usable thermals can often be found at heights of about 150 to 200 metres above the ground and upwards. Circling steeply low down is not considered to be very safe but experienced pilots in competitions do it when the need arises, and it is possible to get away in a thermal from below 150 metres. It appears that on a reasonably good thermal soaring afternoon, model flyers should **expect** thermals of football oval size to exist at heights attainable from a good towline, bungee or winch launch. It also follows that areas of sinking air between thermals will have at least similar dimensions. This implies that if the model is in sink, a well-judged move of something like 100 to 200 metres horizontally may be necessary to find better air but, by the same token, once well into a thermal, small shifts of a few metres this way or that will not usually take the glider out of the lift.

Thermal Streets

Fortunately, convection is almost always organised in some fairly regular pattern. For instance, thermals are frequently aligned along the wind direction (Figure 41.2). It is then possible to fly along a street of lift for surprisingly large distances. The lift along such a street will not be continuous, for there are commonly weaker patches and even areas of sink along the way, but these tend to be less fierce than between streets, so the glider can penetrate them easily and reach the next thermal in the row without much loss of height. It is this phenomenon which probably explains the so-called wave lift found sometimes by model flyers. Once lift is found, be heading into wind and flying at the airspeed for minimum rate of sink, the model can gain height without circling, sometimes for several minutes, perhaps longer. Quite often in these conditions a model which has drifted far downwind by circling in one thermal, can fly all the way back upwind to join another glider circling overhead, with no loss of height on the return, or even a gain. The model eventually runs out of the end of the belt of lift, but even then, by casting around a little, the next street of thermals may be found and the same exercise repeated.

In full-sized gliding now, the best pilots quickly recognise the thermal streets and use them to the fullest possible extent, rarely having to stop to circle but flying very fast through the sinking and weak patches, pulling up steeply to pass

slowly through the better stretches, so regaining height lost, then diving steeply to accelerate to 200 kph or so when sink has to be penetrated. This switchback style of flight is called dolphin soaring, and can be copied by model flyers, except that it quickly takes the model out of sight.

If thermal streeting is suspected, it is important to remember that the sink areas will also be aligned. If it seems likely that the model is in a sink street, the best chance of finding lift is to turn at right angles to the wind, to one side or the other, flying across the sink towards the flanking upcurrents. Such convective patterns tend to be on the large scale. A thermal street may be a thousand or more metres wide, containing strong lift in narrow cores embedded in the more diffuse areas of gentler upcurrents. The sink streets on either side are likely to be just as broad or broader. A model launched into sink may not reach the lift before having to land.

If there are genuine lee waves in the region, thermals may be associated with these (Figure 41.3). This can give a street pattern running across wind, since the upward part of the lee wave assists the thermals to rise, while the down wave kills them. Whether the model glider pilot will recognise this situation from the ground is doubtful but, as usual, if it is borne in mind it may prove useful. Waves combined with thermals were also once thought to be impossible, but it is now well known that they do sometimes combine in the way described.

At altitude that models do not normally attain, thermal waves occur (Figure 41.4). A strong thermal, pushing up to a height where the wind is stronger, presents an obstruction to the high level flow. The air rises up and over the thermal, creating a wave. It is sometimes possible to see this happening. A strongly growing cumulus may acquire a hat or eyebrow cloud where the wave rises over it. It also happens without cloud but is, of course, much less easy to detect.

Using Thermals and Getting Home Again.

To find a thermal becomes something of an art in which experience helps a great deal. When models are hand-towed for launching the towline runner can detect a thermal by the tension in the line and can release the model in the lift. This is done with free flight models using the circle tow technique by which the towline runner keeps the model on the line, circling overhead, until the lift is felt, and then the model is released. (A special type of release hook is required.) Beginners with radio controlled soaring should watch other pilots and take advice from those who succeed.

A systematic search for lift should be made on every flight. If sink is found, fly out of it by trimming for higher speed and keeping straight. Where there is sink, can lift be far behind? Watch

the model very carefully and do not give up the search for lift too soon. A model entering lift will almost always react immediately. The indication may be a wing suddenly rising, or the model pitching about where before it was flying steadily. If a wing pops up it may be caused by a thermal on the side of the raised wing, so turn that way and investigate. Experience is required to avoid the well-named stick thermal, which is caused by the pilot twitching the elevator and so causing an illusory climb. Fly steadily, look out for birds circling, and be ready to follow them or other models into lift.

In the absence of any such help, as will appear from what follows, changes of wind direction on the ground are quite often useful indicators of a thermal nearby. The thermal may be drawing air into itself from some distance all round, so following the inflow may lead to the core.

To recognise that the model is in a thermal requires the pilot to watch very carefully for signs that the aircraft is climbing. If it appears to be gaining height, or at least not losing any, continue circling, but be ready to search a little this way or that for better lift. Once in a strong core there will be no doubt, and then, with a **stable** model, it may hardly be necessary to do anything with the controls at all. Settled into a steady circle with constant angle of bank, the model will remain in the thermal and go up rapidly.

To remain in the thermal, once it has been found, the model must keep on circling, which invariably results in the glider drifting laterally as the thermal drifts with the wind. The usual cycloidal pattern relative to the ground results (as discussed in Flight Analysis No. 38). It is an error to try to prevent this drift by varying the bank angle and frequently straightening out, as some beginners do. This tends to work the glider to the edge of the thermal core and eventually out of it altogether. Circling soon finds the aircraft a long way downwind of the landing area, and the pilot must judge whether the height being gained is enough to enable the model to reach base again in a long, straight glide down, probably, some sinking air to be penetrated on the way back.

As always, penetration through sink and against the wind requires a high airspeed, often about twice or three times that theoretical airspeed which yields the flattest glide in still air (Figure 41.5). It is fairly easy to judge when a model is flying fast enough to get home from such a downwind excursion. If, when it is heading back towards base, the line of sight from the pilot's position is falling, the glider is undershooting. Against the wind, the only hope then is to trim forward for greater airspeed, even though this will cause the model to lose more height for a few seconds. If the line of sight begins to rise

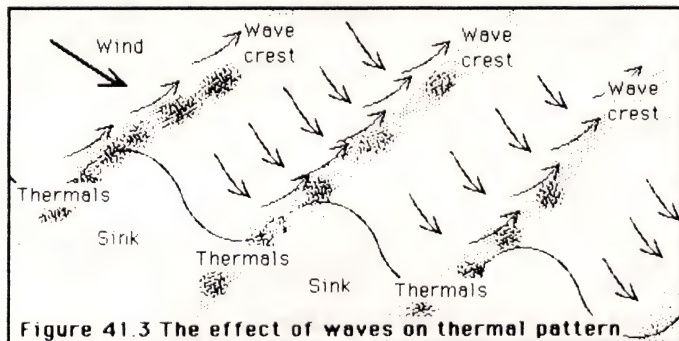


Figure 41.3 The effect of waves on thermal pattern

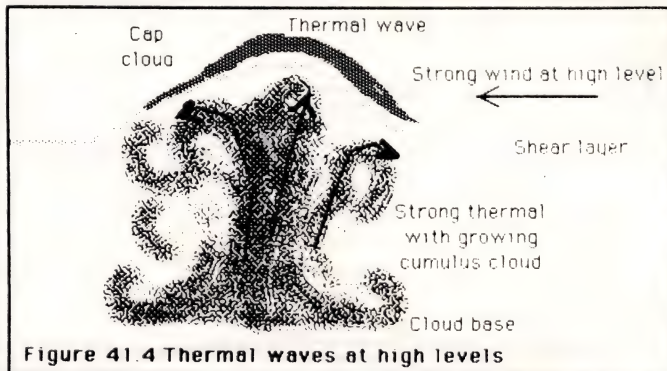


Figure 41.4 Thermal waves at high levels

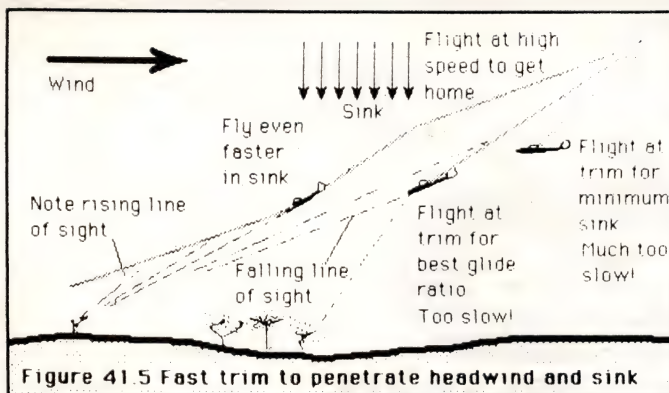


Figure 41.5 Fast trim to penetrate headwind and sink

the model will get back, unless sinking air is encountered. In this case, more speed still is required, with, as before, an initial frightening loss of height.

It is a common mistake to think that gliders should be trimmed for the best L/D or flattest glide angle when trying to make progress over the ground into wind or through sink. The best L/D trim, although somewhat faster than that for minimum sink rate, is still quite slow. The required trim for penetration is invariably faster than that. Flying slowly into wind may actually have the glider moving backwards relative to the ground, so more airspeed is essential to cover any ground distance. In sinking air it is much more important to get through the bad air quickly and emerge into something better than to wallow about in the sink too long and so never emerge at all.

Thermal Structure

There is much debate about the structure of thermals, and a good deal remains to be discovered. Modellers tend to imagine the thermals they use as more or less vertical columns of air, or plumes of fairly narrow cross-section. Circling within such a column takes the model upwards. It is often possible for a model low down to fly underneath another one which is climbing, and enter the same thermal, and other models may follow suit until a whole gaggle forms in a circling stack one above the other. Full sized gliders do the same thing. This suggests that there is a continuous column of rising air all the way from the ground up to the top of the convection layer or into and beyond the cloud base.

It may be supposed that such a column is associated with some hot spot on the ground, and many school text books re-inforce this belief. Soaring would be simple indeed if the pilot could rely absolutely on the known local warm spots producing a constant thermal current all day long as these books seem to imply. There certainly are differences in temperature on the ground. Dark areas of bare soil or rocks, city streets,

macadam roads, car parks and runways tend to be warmer than greenery, growing crops and forests. Irrigated land, swamps, lakes and rivers tend to be cool. These differences must relate to the formation of thermals, and any model flyer who has operated for a while in one district soon gets to know places on the ground which do seem to produce lift on many occasions (Figure 41.6).

But thermals invariably drift away from the place on the ground where they are supposed to originate. This must cut off the supply of hot air at the roots. On many occasions a glider may fly underneath another one, or even try to join a whole gaggle soaring, and fail to find any lift. In the early days of convection studies it was surmised that, rather than columns, thermal plumes were more or less bubble-like. A mass of air, heated over an area of hot ground, might break away as a whole and ascend, perhaps taking on the shape of sausage standing on end, but once the plume had broken loose it must drift and there would be no more hot air fed in from underneath. The hot spot on the ground would then brew up another bubble which, after an interval of perhaps twenty minutes, would produce another detached plume (Figure 41.6). This could explain why gliders joining others from below would sometimes catch the lift but sometimes would arrive too late and miss it. There seems to be something in this theory, but it does not explain all the experiences.

One puzzle is that a glider, contacting a thermal very low down with only a few hundred metres of air beneath, is usually able to climb in it for minutes on end and reach a great height. During this time the glider must sink at its normal rate of descent through the rising bubble while being lifted by it. If there is no continuous column all the way up from the ground with new warm air constantly being fed in from below, it is hard to understand why the glider does not, so to speak, fall out of the bubble at the bottom after a little while as the warm air rises past it. The glider

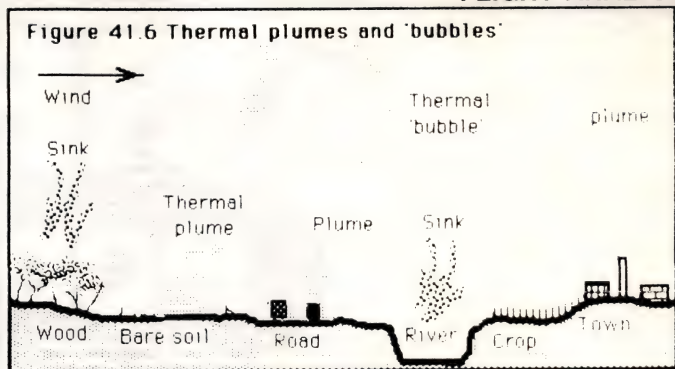


Figure 41.6 Thermal plumes and 'bubbles'

must sink through hundreds of metres of air (Figure 41.7), much more than there is underneath it at the start of the climb.

The Ring Vortex Theory

Observations in flight, and experiments, originally with liquids of different densities in the university laboratory, indicate that a typical isolated thermal often has the ring vortex structure sketched in Figure 41.8. Rather than being a tall sausage or plume shape, such a ring vortex is roughly spherical or, perhaps, doughnut shaped as a whole; the hole in the doughnut representing the core of strongest lift. The bubble, having been heated by close proximity to the ground, begins to rise as a plume, but as it does so the upper part is retarded by the resistance of the surrounding air, spreading out somewhat like a mushroom as the rest up the bubble pushes up from below. This sets up an internal circulation within the bubble.

At the top the air spreads outwards, is overtaken by the rest of the bubble still thrusting up, and is then drawn in again to create an inflow at the base. This keeps the core fed constantly from below. The air feeding in is not any longer connected with the ground, but is the bubble's own air from the top, having moved down and round the margins, to re-enter underneath. The doughnut, in a sense, is constantly turning itself inside out in a rolling motion as it rises. Thus, a glider entering the thermal from below can circle and rise for long periods, using the same air going round and round the ring vortex, even climbing faster than the bubble as a whole. The glider may come up through the centre of the ring into the upper region where the air tends to flow outwards, and thereafter it is likely to rise only at the rate of the whole bubble. Other gliders arriving underneath in time can catch the vortex ring, but the latecoming pilot finds no column of lift extending far below.

To be continued

Figure 41.7 Problems with the thermal 'bubble' theory

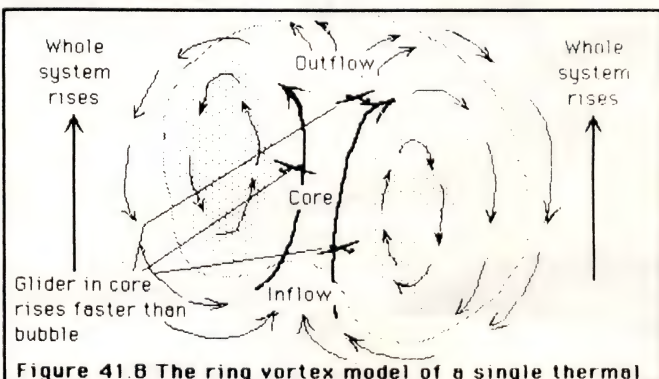
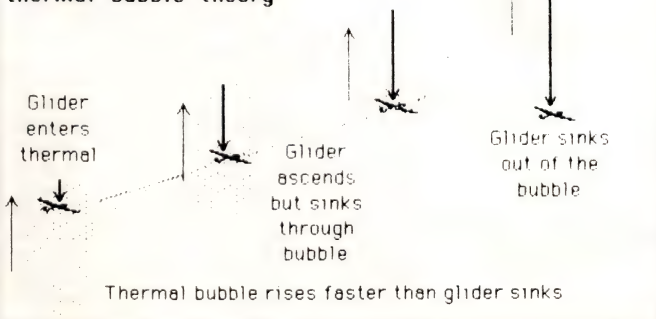


Figure 41.8 The ring vortex model of a single thermal



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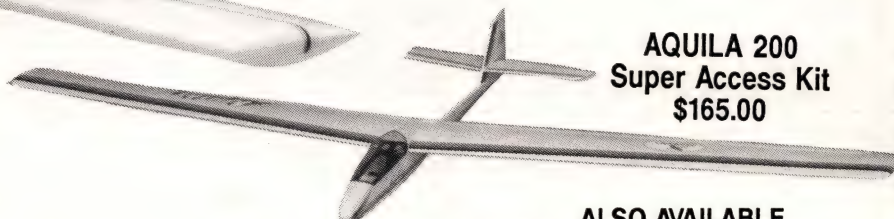
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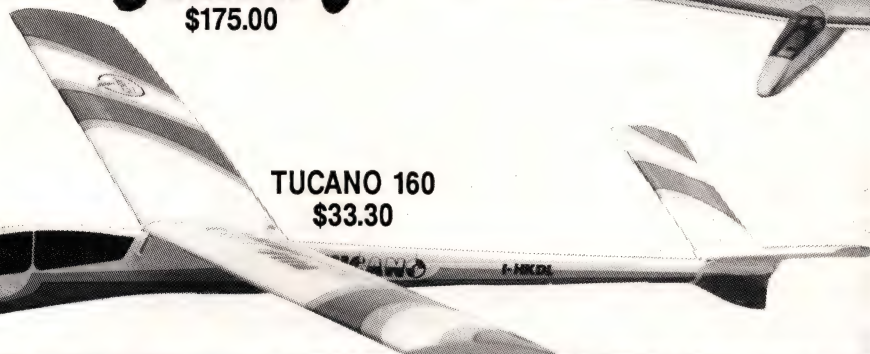
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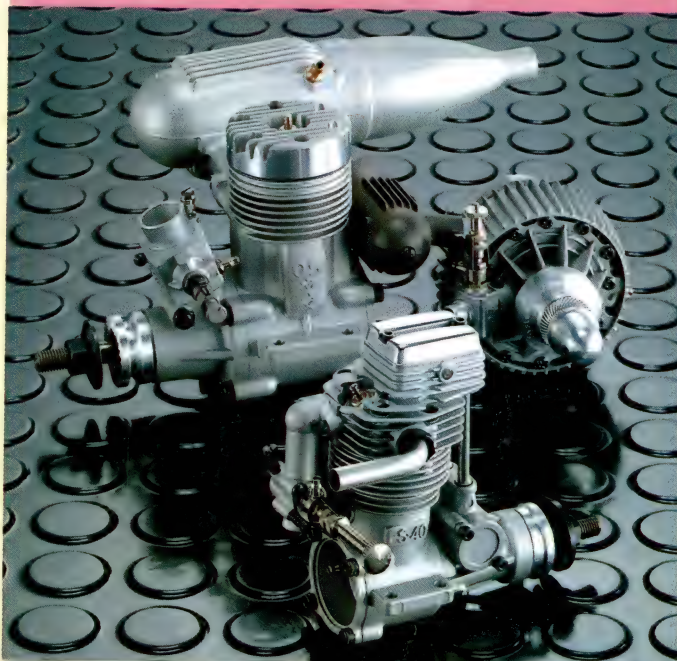
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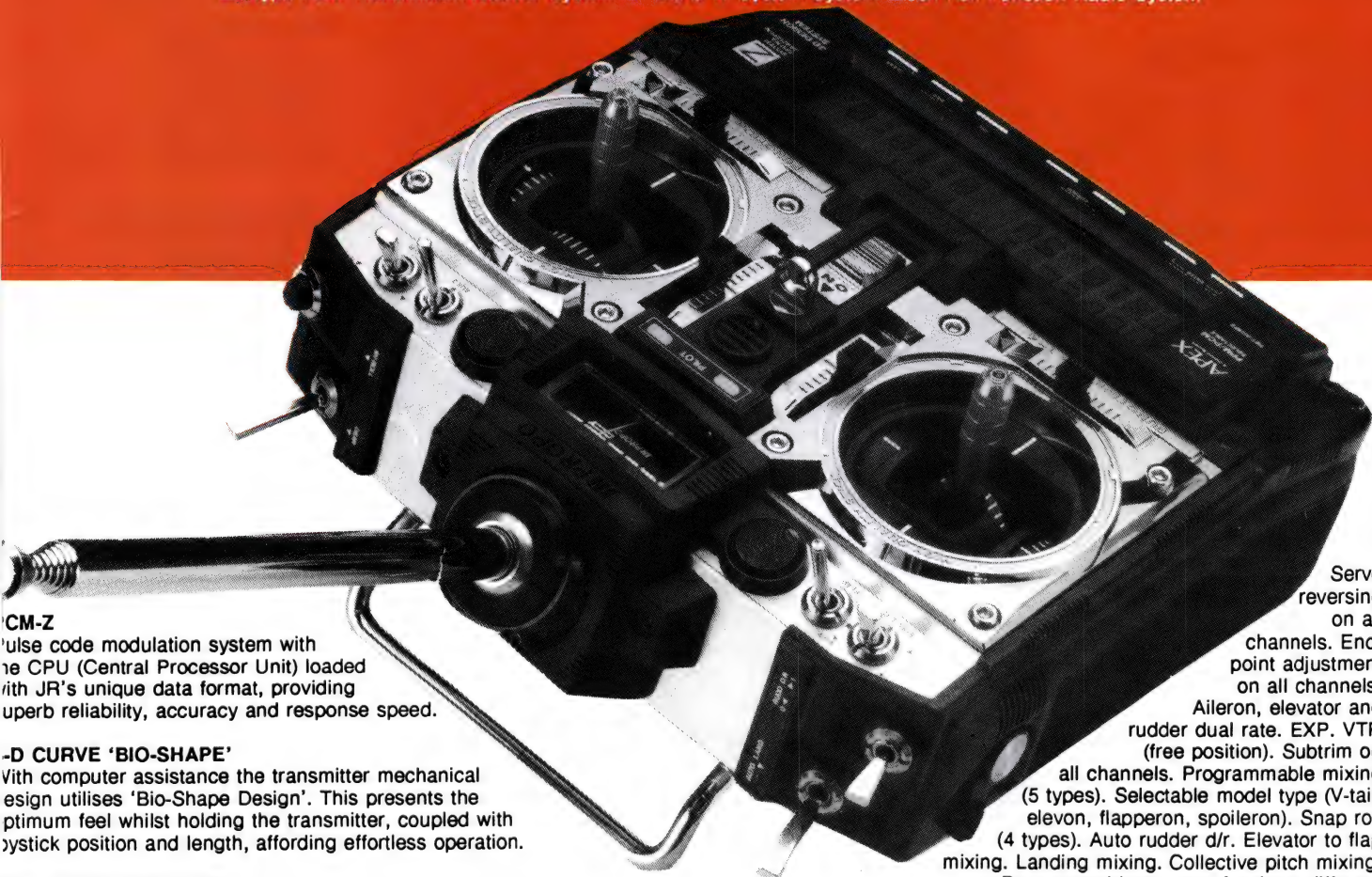
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S.A.

ABC Models P/L, 117 Unley Rd., Adelaide, 5000; (08) 373 1191
ABC Models P/L, Shop 3, 1700 Main North Rd., Salisbury Plain, 5109; (08) 258 4485
Hobby Habit, 462 Main North Road, Blair Athol, 5084; (08) 349 6242
Model Flight, 42 Maple Ave., Keswick, 5035; (08) 293 3674
Model Flight, 670 Main North East Rd., Holden Hill, 5088; (08) 261 0396
Model Mania, 253 Main South Rd., Morphettville, 5152; (08) 382 4957
Northern Discount Hobbies, Corner North East and Tartan Rd., Holden Hill, 5088; (08) 261 8929
South Australian Hobby Centre, 1st Floor, 135 Rundle Mall, Adelaide, 5000; (08) 232 0080
The Hobby Habit, 7/269 Main North Rd., Sefton Park, 5083; (08) 344 8575

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North Australian Model and Hobby Supplies, 61 Dalwood Crescent, Sanderson, NT, 0812; (089) 27 7254

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ABC Models P/L, 532 Albany Highway, Victoria Park, 6100; (09) 362 4244
ABC Models P/L, 793 Canning Highway, Applecross, 6153; (09) 364 4255
Ace RC Models, 850A Beaufort St., Inglewood, 6052; (09) 370 3233
North Beach Cycles & Hobbies, Shop 2, 117 Flora Tce., North Beach, 6020; (09) 447 1450
Perth Hobby Centre, 385 Murphy St., Perth, 6000; (09) 322 3376
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Toy Warehouse, 211 Invermay Road, Launceston, 7250; (003) 26 1577

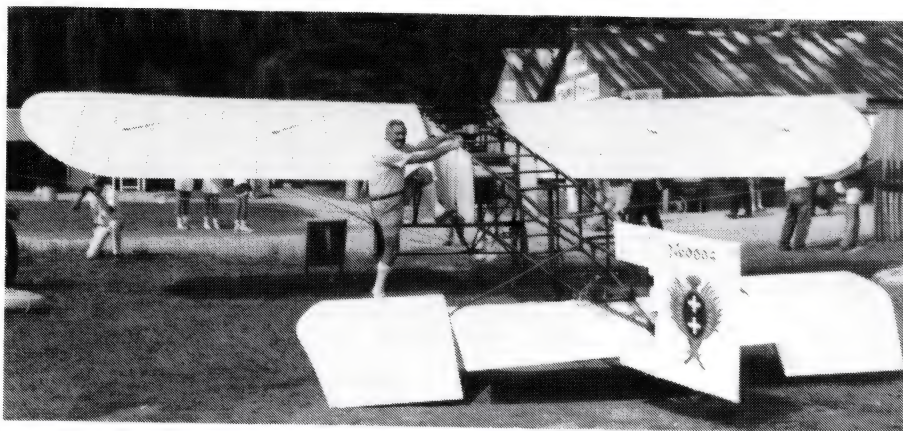
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Bryzen Hobbies, 47 Macquarie St., Fennell Bay, NSW, 2283; (049) 59 1145
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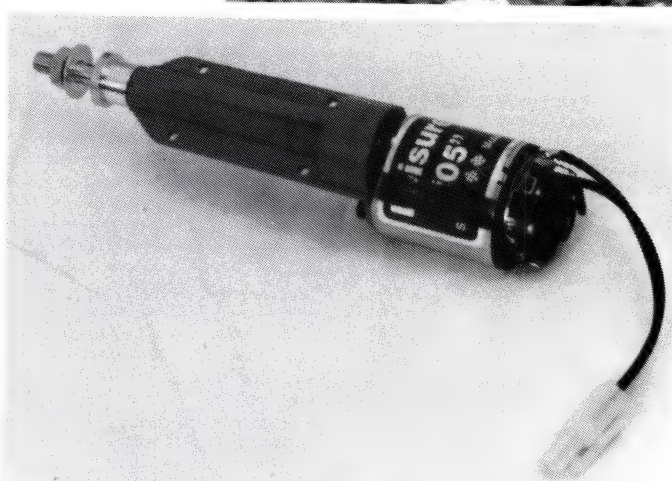
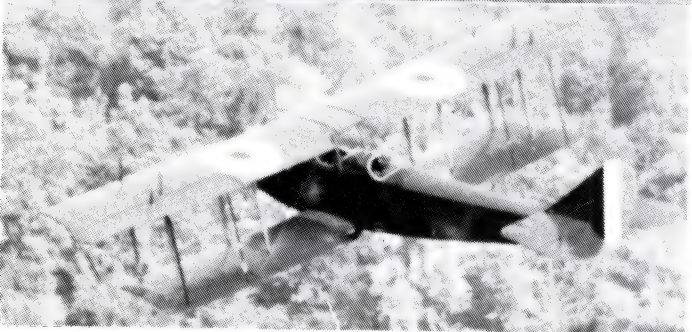
JR Remote Control Aust. Pty. Ltd., 424 Station St., Box Hill, Vic., 3128; (03) 890 0660
Model Engines (Aust), 57 Crown St., Richmond, Vic., 3121; (03) 429 2925
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The original Bleriot 11 at the Rhinebeck display. Fully air conditioned! That's one small step for!

Top right, the Albatross and Sopwith Dolphin fly past in friendly formation at Rhinebeck, under a clear, blue sky.

Below, the Morane Saulnier parasol and Curtiss JN4 (Jenny) over the oak and beech forest at Rhinebeck.



Now available from Astropower-Leisure Australia, the popular range of Leisure Electronics products, including the stock, plain bearing motor and long gearbox with beam mounting. Motor has replaceable brushes and heat sink brush holders. Also available, modified motor and reduction gearboxes with 2.5 to 1, 3 to 1 or 3.8 to 1 ratio. Leisure kits of Playboy, Lanzo Bomber, Amptique and American Eagle Eaglet kits stocked. Contact Astropower-Leisure at 33 Vincent Street, Oak Park, 3046; or ring Malcolm on (03) 306 5534 [AH].

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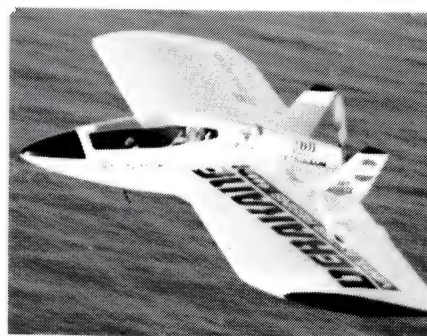
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LARGE: 1/4 Scale, 1.65 metre wing span.

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Come see the Scale Facet Opal fly at the NSW Central Coast Model Aero Club Swap Meet and Fun Fly.

For Fun Fly details contact
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Rendez Vous at Rhinebeck

Conducted at the Central Hudson Radio Control Model Flying Club
from Ron de Chastel



Great Lakes Trainer. Red and white aircraft in hazy blue sky over Rhinebeck.



Curtiss Flitewing air-to-air over Rhinebeck, New York state, USA.

Old Rhinebeck photos by Ron de Chastel.

If you cannot place this club then you haven't been to the USA. Established nearly 30 years ago, this club operates in New York State near the beautiful Hudson River, which winds its way through picturesque countryside for hundreds of kilometres, from the very north of the USA to New York Harbour.

Each year this club organises a World War 1 and earlier Jamboree which attracts over 100 participants. Events flown are AMA Scale, Combat, Manoeuvres, Giant Scale and Mission, with some members flying in all events with the one aircraft. This year it was flown at Old Rhinebeck Airfield prior to the full size air show.

Our attendance at this year's event created a lot of interest, and we were welcomed in the best modelling manner, both personally by the contest director and by the public address announcer. Makes you real proud to be an Aussie.

There were three flight areas about 80 to 90 metres apart, each carrying two events being run simultaneously. Often there were six aircraft airborne and often over-lapping at the central zone. The grove of tall trees very close claimed

several models, and the announced call of "we need the chain saw" punctuated good public commentary.

Models generally were similar to our own seen on club days, with top models of very high standard. Four-strokes and Quadras were very popular, and Futaba, Airtronics, Kraft and JR were the favoured radios. A vast array of helpers, judges, scorers and pound keepers kept the event running smoothly. Models (and modellers) just kept flying, and rarely did a modeller need to be called more than once.

½Eindeckers and Taubes, ranging from film covered quickies to well detailed models, were very popular subjects for Combat and Mission events, and the classic Fokkers and Sopwiths, generally of very high quality, dominated AMA and Giant Scale and the Manoeuvre events.

An excellent dinner evening, at which we were again made very welcome, was held at the Red Hook Fire House on the Saturday evening. A 'Family' style serving to each table allowed one to choose just what and how much, with free drinks (sensibly consumed) all evening.

An excellent event in a seemingly laid back style that will certainly remain in my memory box.

Results

Combat	Nick Zirola Snr & Jnr Bob Brassell & Louis Schwake Dave Baron & Dave Luchapo
AMA Scale	Bud Roane Tom Polapink Bob McKay
Manoeuvres	Bud Roane Bob McKay Dick Allen
Giant Scale	Nick Tusa Ralph Jackson Bud Roane
Mission	Bob Brodea Barry Couchman Harry Peters

Prizes ranging from Airtronics radios and Dremel Motor Shops to goodie bags of modelling equipment were awarded down to fifth place.



At the Central Hudson RC Club Jamboree, Bud Roane flew this Sopwith Pup to first place in AMA Scale, and first place in the manoeuvres event. Engine is a Fox 45, the radio a mixture of Kraft, Airtronics and Royal! Ron de Chastel photo at Rhinebeck field.



Frank Stanton at the nose of his scale Fokker Triplane at Rhinebeck '89. The 7.27 kg model is powered by a Quadra 35 with an 18 x 8 prop turning at 7,500 rpm. Smart paint job of black, white, yellow and olive drab on Coverite covering.

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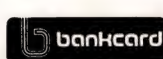
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Magazine, Crawford Marine Morwell, B & D Model Trading, X-Cell Products, The Hobby Hangar, Picco Model Engines (Aust.), ABC Models and Bell Marine Services. Without their help the Nats would not have been the success they were.

RESULTS

3.5 cc FSLH (5 entries)

Tony Ricciotti (MMBC)	85.20 kph
Steven Bass (RMBC)	71.70 kph
George Groves (RMBC)	58.10 kph

7.5 cc FSLH (9 entries)

Tony Ricciotti (MMBC)	*107.60 kph
Eric Arlitsch (HVMMC)	97.10 kph
George Groves (RMBC)	89.20 kph

15 cc FSLH (9 entries)

Eric Arlitsch (HVMMC)	107.60 kph
Ken Cunningham (RMBC)	104.20 kph
Tony Ricciotti (MMBC)	101.70 kph

3.5 cc FSLT (3 entries)

Barry Craven (SMPBC)	65.20 kph
Domenic Delbene (WAMBC)	43.00 kph
Leigh Foster (RMBC)	40.80 kph

7.5 cc FSLT (3 entries)

Russ Tillyard (MBOMBC)	79.90 kph
George Groves (RMBC)	64.40 kph

15 cc FSLT (11 entries)

Max Raffaele (WAMBC)	*90.40 kph
Greg Carter (GCMPBC)	87.50 kph
Ken Cunningham (RMBC)	86.50 kph

3.5 cc FOVM (10 entries)

Ken Cunningham (RMBC)	551 pts
Stephen Rock (MSPBC [SA])	579 pts
Robert Verditch (IMPBC)	340 pts

7.5 cc FOVM (8 entries)

Greg Carter (GCMPBC)	591 pts
David Garrard (SMPBC)	548 pts
Ken Cunningham (RMBC)	199 pts

15 cc FOVM (7 entries)

George Groves (RMBC)	587 pts
Travis Smith (GMBC)	581 pts
Ken Cunningham (RMBC)	400 pts

3.5 cc FSLM (2 entries)

Stephen Rock (MSPBC [SA])	45.20 kph
---------------------------	-----------

7.5 cc FSLM (4 entries)

Greg Carter (GCMPBC)	75.30 kph
Ken Cunningham (RMBC)	69.90 kph
Paul King (MSPBC [SA])	46.30 kph

15 cc FSLM (6 entries)

Ken Cunningham (RMBC)	70.20 kph
Scott Evans (MMBC)	52.90 kph
Jason Hough (IMPBC)	45.10 kph

3.5 cc FSR Multi (10 entries)

Greg Leigh (MSPBC [SA])	626 pts
Barry Craven (SMPBC)	568 pts
David Leigh (MSPBC [SA])	532 pts

6.5 cc FSR Multi (10 entries)

Ken Cunningham (RMBC)	610 pts
Peter Bass (RMBC)	522 pts
Syd Curry (MEMBC)	465 pts

15 cc FSR Multi (11 entries)

Ken Cunningham (RMBC)	740 pts
George Groves (RMBC)	569 pts
Anthony Mott (RMBC)	535 pts

3.5 cc FOVH (9 entries)

Andrew Sketcher (GCMPBC)	404 pts
Ron Haylen (ACTMPBC)	345 pts
Paul Savoy (IMPBC)	169 pts

7.5 cc FOVH (15 entries)

Bill Annabel (GCMPBC)	663 pts
Craig Chenco (MMBC)	625 pts
Eric Arlitsch (HVMMC)	446 pts

15 cc FOVH (15 entries)

Scott Evans (MMBC)	652 pts
Ken Cunningham (RMBC)	618 pts
Paul Jenkins (HVMMC)	578 pts

3.5 cc FOVT (4 entries)

Domenic Delbene (WAMBC)	446 pts
Barry Craven (SMPBC)	355 pts
Leigh Foster (RMBC)	306 pts

7.5 cc FOVT (10 entries)

Greg Carter (GCMPBC)	622 pts
Russ Tillyard (MBOMBC)	416 pts
Rod Prickett (RMBC)	404 pts

15 cc FOVT (20 entries)

Ken Cunningham (RMBC)	637 pts
Chris Brown (IMPBC)	573 pts
Max Raffaele (WAMBC)	445 pts

(* = Australian Record)

MORE RACING

from Richard Anderson

The Brisbane Model Marine Club hosts only one race meeting a year now. Possibly because of this it has grown to be second in stature to the Queensland Champs. Up for grabs This November were seven very nice trophies, some being donated by Model Sports & Hobbies of Nundah. Competition was keen amongst the entrants from Brisbane, the Gold Coast and the Hunter Valley Club of NSW. The standard of racing was quite high, although there were a couple of minor accidents, probably resulting from at least half of the field running similar speeds, making for very close racing. After nine rounds the points were so close between the leading three drivers that whoever won the last race won the day. The competitors from NSW struggled with setting their boats up in the morning, but started running very hard after lunch, with Ron Taylor driving the fastest race time and was fourth outright. George Freemantle from Brisbane was awarded the Hard Luck trophy after he started all ten races but flipped his fast, loose riding 45 mono in nine races! Richard Anderson won the trophy for best presented boat. Greg Carter, with Steve Ballinger as pit crew, won the Pit Competition event. This was for the fastest time to start, launch and complete one lap of the course; a novel idea and well received.

For anyone who would like to attend in 1990, the race is for any legal hull design with total engine(s) capacity up to 30 cc. There are ten races, with points awarded relative to race times, plus 50 points for each lap completed. All ten races count for points. The course is a surveyed 1/4 km per lap, with a high drivers' stand, shade for spectators and barbecue facilities. Practice should be available on Saturday this year to help any visitors. For more information contact: **Richard Anderson, 13 Wordsworth Street, Strathpine, 4500.**

RESULTS CHART

	Hull	Engine	Nitro	Prop	Radio	Heat Time	Points
1. Russ Tillyard	Aero Marine Cat 38"	OPS 15	25%	X460/3	PSA	1:58.6	6554
2. Richard Anderson	Twin Craft Mono	CMB 15	27%	X460/3	Futaba	1:54.0	5917
3. Greg Carter	Aero Marine Cat	OPS 15	25%	260/2	KO Wheel	2:00.4	5814
Fastest Race Time:							
Ron Taylor	Water Spyder Hydro	OPS 45	40%	255/2	KO Wheel	1:51.8	

THE MARINE SCENE



NATS '89

by Peter Bass

Russ Tillyard passing Dennis Beresford in the front straight at the Queensland Water Derby. Photo from Richard Anderson.

National competition usually means sorting the men out from the buoys (er, boys), but at this year's model boating Nats some exciting new talent appeared, and actually showed some of the older and more experienced modellers what model boat racing is all about! Top young modellers Scott Evans, Jason Hough, Steven Bass, Leigh Foster, Paul King, Stephen Rock, Craig Chenco, Robert Verdich, Travis Smith, Andrew Sketcher, Paul Jenkins, John Foster and Chris Brown featured prominently in this year's placings.

The competitors' standard of driving, boat presentation and personal behaviour was exemplary, without exception. This was the prime factor in the success of this year's Nats. The entries of Americans Mark and Judy Vallery and West Aussies Max Raffaele and Domenic Delbene provided the southern and eastern staters with some real opposition. Although Mark and Judy failed to get any placings, the sheer brute power, speed and handling characteristics of their boats had all competitors spell-bound whenever they were on the water. Max Raffaele returns to the west with a new Australian speed record to his credit and 3rd placing in the 15 cc Oval Tunnel class, and Domenic Delbene takes home first place trophy in 3.5 cc Oval Tunnel class. Both drivers should be proud of their efforts, as WA has not been represented at the Nats for quite some time and they lack the competition provided in the eastern states.

Ken Cunningham (Vic) was presented with the **Middleton Trophy** for his overall effort during the Nats, with 5 first placings, 3 seconds and 3 thirds, giving him a total of 53 points from his best four events. Second was George Groves.

Barry Craven (NSW) won the **Doctor Jock Best Presented Boat Award** with his 3.5 cc Tunnel boat. Jason Hough (NSW) was awarded the Hydro Hull presented by David Oliver of Picco (Aust) for the best effort by a newcomer to the hobby during the titles.

Ron Haylen was MC at the Presentation Dinner held at the conclusion of the Nats, with some 60 people attending, to applaud those who collected the 66 trophies awarded for the placings.

On Day One there were 50 entries in the **Straight Line Speed** event. Although there were several rain showers and windy conditions at times, and the lake size was not conducive to

top speeds, two Australian speed records were broken! Tony Ricciotti (Vic) now holds the 7.5 cc Hydro record, with an average two-way speed of 107.6 kph and a top one-way speed of 111.2 kph, which was also the top speed recorded in the competition. Tony runs his own designed **Stinger Corsa 45** Hydro, powered by a CMB 45 drinking 30% nitro and pushing an Octura 1955 prop. In the 15 cc Tunnel class, Max Raffaele (WA) now holds the Australian speed record of 90.4 kph, set with his OPS 90 powered **Sprint Cat**. His top one-way recorded speed was 91.1 kph.

Four over-the-ton speeds were recorded, with Eric Arlitsch (NSW) recording 107.6 kph for a two-way average, with a top one-way speed of 109.4 kph. Eric's boat was a **Water Spider** powered by a stock 67 K&B, drinking 20% nitro and pushing a 2.6 Octura prop. The boat weighs 9.2 lb, and the above speed was just enough to win the 15 cc Hydro event, as Ken Cunningham (Vic) recorded 104.2, and Tony Ricciotti (Vic) recorded 101.7 kph.

On Day Two 31 entries battled out the honours in the **Multi Class**, with the wind and rain bothering both competitors and their craft. However, due to the design of the multi boats, they are not as affected by choppy conditions as are the hydros and mono type hulls. Ken Cunningham was dominant in this class with wins in the 6.5 cc and 15 cc events. Both were Stigwell hulls, with the 6.5 cc winner being powered by an OPS 40 and the 15 cc by an OPS 90.

By far the most reliable and hotly contested races were in the 3.5 cc class. Greg Leigh (SA) was the ultimate winner, but the final top placings could have gone to any of six competitors. In the 6.5 cc class Ken Cunningham and Peter Bass (Vic) were only a lap apart after the second heat, but brain fade caused Peter to submarine his OPS 40 powered Omega 50 in the last heat to let Ken take the 6.5 cc title easily. Ken proved that consistency and reliability are the name of the game by taking out the 15 cc title with lap scores of 48, 50 and 50, respectively.

The most exciting race of all was in the last heat of the big 15 cc multis, which had the large crowd of onlookers on their feet. Anthony Mott (Vic) and Peter Bass put caution to the wind and drove their boats to the limit in the choppy conditions. Peter Bass came through to win the heat, little consolation for not getting a placing, but

winning is not necessarily the best part of racing!

Days Three and Four had fast and close action, with hydros, tunnels and monos vying for gold in the **Oval Racing** heats. Weather conditions were perfect, with only a very slight breeze. 98 entries and 60 races made for hectic work in race control, with David Lweigh flat out recording results on his Sanyo lap top computer.

Reliability is most important, and a lack thereof deprived many of the competitors of placings. Only 15 racers successfully completed 3 heats. Again Ken Cunningham stood out, with well prepared boats: 5 placings, 3 of those with 3 completed heats in each event.

One of the closest scoring races in the Oval event was in the 15 cc mono class, where lack of start line practice cost Travis Smith (Vic) first placing. George Groves (Vic) won the event by only 6 seconds over the 3 heats! Another notable race was the 7.5 cc hydro event where Bill Annabel (Qld) was pushed to the limit, holding back Craig Chenco (Vic). Craig's driving is a tribute to him, as he is a relative newcomer to the hobby, compared with Bill's experience. The most gripping of all races at the Nats was the 15 cc oval hydro event, with 5 big hydros crossing the start line simultaneously, and 5 completing the race within 1/2 lap of each other! The victor in this race, with only 3 race meetings under his belt, was Scott Evans (Vic). He drove a **Stinger Corsa 67-80** hydro, powered by a CMB 85 drinking 30% nitro and pushing an Octura 1470 prop. The fastest time recorded for the oval events was made by Bill Annabel, with a score of 227 points for an average of 14.6 seconds for each of the 5 laps. This was recorded in the 15 cc hydro event.

Mark and Judy Vallery have promised to return Down Under for next year's Nats to be held in the Sunshine State. We hope that they leave the niggling bugs back in St. Louis and have a better run next year. Mark and Judy have not only left behind a lot of boat performance ideas, but also a lot of friends. Thank you Bill and Gloria Annabel for hosting our visitors.

The RMBC, GMBC and the AMPBA wish to thank the following sponsors of the Nats for their valued support: Model Engines (Aust.), Full Ahead (Aust.), Scott Williamson, Morwell Toy Kingdom, A.L.M. Automotive Services, Morwell Tenpins, Mid Valley Bearing Supplies, Airborne



of holes drilled along the boom allow for adjustment, and also for sails with less area for higher strength winds.

The sails are then fitted to the mast and the rigging checked to see that the mast is vertical and that every component operates. The winch is then tested, prior to fitting the lines to the jib and main, to check the number of revolutions of the drum. From this information you can work out if you need to reduce the number of turns on the winch (if you can) or change the size of the drum. In the case of the Guyatt winch either option can be used. The two take-off points on the deck are then fixed by the use of eyebolts through the deck, making sure that the distance between them is equal to that between the boom and jib swivel points and the boom fixture point on the jib and main. This ensures that both the jib and main always winch in and out at the same speed.

The boat is basically finished. All it requires now is measuring to see that it rates to the RA rules, painting to suit the owner, and launching. The hatches were sealed and the boat was given a short test on my dam to make sure that it didn't leak, then off to the club measures to check that it rated. It did, and sailed well by itself, so I had no benchmark.

If you have any questions for me, or problems needing solving, just drop me a note at **RMB 431, via Bungendore, NSW, 2621**, and I will try to help. Don't forget an SASE if you need a reply.

Hub Bell of WA, new President of the AMYA, about to head for the water with his RM at the Nationals. Nats photos by the columnist.



At the previous National Championships at Jackadder Lake in suburban Perth, the RM of Des Ledger (861) tacks onto the starboard lay-line as Ray Tillbrook's Spider (545) prepares to round the windward mark. Photo and caption from Norm Skeen.

At the Nationals, Bruce Kennewell with his Trolley Jack designed by Frank Russell.



STOP PRESS

KRAFT MASTERS

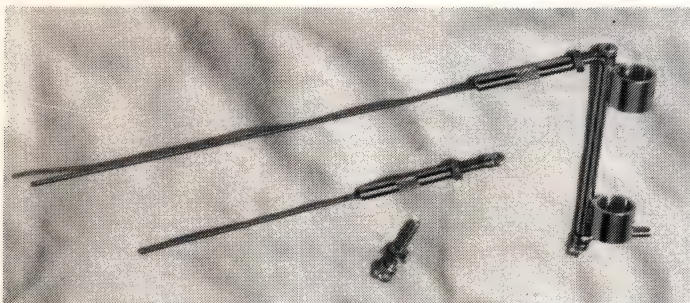
The Aero Sports Federation of China will send national aeromodelling team to participate in the Kraft Masters Asian-Pacific RC Aerobatic Championships to be held at Drages Airport, Wangaratta, Victoria.

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Left, fittings by Ron Attard: gooseneck, rigging screw and eyebolt (see text). Below right, fittings by David Black: turnbuckle, pulleys and eyebolts. Davids address is in text.

warded samples shown in the photographs.

Ron Attard forwarded a **gooseneck** with a kicking strap to suit the 10.5 mm carbon fibre Bantock groovy mast. The fitting has been well made and would give many years of reliable service. The fitting is also available for the 14.5 mm alloy and 12.7 mm carbon fibre and alloy Bantock masts. Cost is \$30.00.

Ron has also introduced a **rigging screw**, suitable for all classes, at a cost of \$45.00, and an **eyebolt** at a cost of \$2.00. The above prices are retail; wholesale prices are available on request. Ron's address is **17 Quinn Street, Frankston, Vic., 3200**.

David Black forwarded a sample of his **deck mounted pulley**, which is an updated version of the deck pulleys that I have been using for the past four years in RA and Marblehead yachts. Cost is \$3.00. David also supplied a **turnbuckle** with 18 mm adjustment at a cost of \$3.00 and two **eyebolts**, one heavy duty (18 mm long) and a lightweight one (10 mm long). Cost is \$1.50. David's address is **11 Patkin Street, Oxley, Qld., 4075**.

Rob Guyatt has advised me that he has changed the specifications of his **electronic sail winch**. He has reduced the operational voltage from the previously stated 7.2 volts to 6 volts. **GREMLIN**

A gremlin crept into the formula for the RA Class in the last issue (No. 97). A plus sign was where a multiplication sign should have been. The correct formula is:

$$1.00 = \frac{L + \sqrt{S}}{4} + \frac{L \times \sqrt{S}}{12 \sqrt{D}}$$

COMING EVENTS

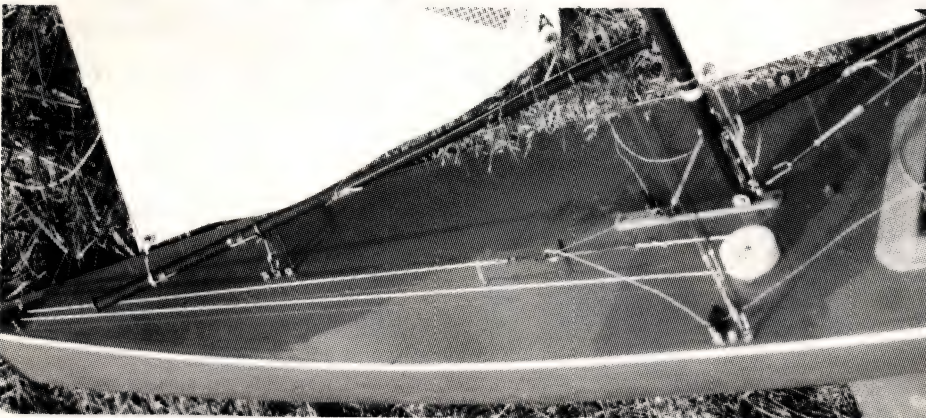
March 31 to April 1: Vic RM State Titles

April 8 and 22: NSW RA State Titles

(2 Rounds: 1 at Sydney; 1 at Canberra)

June 10 to 12: Vic RA State Titles

July 28 & 29: Monaro Cup: Club Challenge; RA Match Racing



A swivel jib fitting similar to that used on the Alien, set up here on an RM. Photo: I. Kirley.

PROJECT ALIEN - Part 3

This covers the rigging and finishing of the yacht. For the beginner, most model yachting books and plans give the basic concepts as to rigging a yacht. Alternatively, **Float-a-Boat (14 Army Road, Boronia, Vic., 3155)** produce a guide (cost about \$2.50) showing the basic concepts required for rigging and how to make them.

In this case I used a Bantock 14.7 mm alloy groovy mast, spreader kit, locally produced rigging screws and gooseneck fitting. The booms were made from alloy tube, the chainplates and the jib-rack from alloy angle and the mast crane, mast step and the backstay deck anchor point from alloy T-section. The stays were 80 lb plastic coated fishing trace wire, but in the future they will probably be replaced by 0.8 mm stainless steel wire.

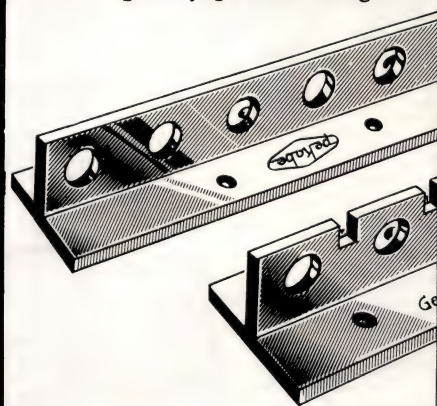
The jib uses a swivel system (see photo) which is very simple and easy to assemble. The clew adjustment (on the end of the booms), to allow the adjustment in sail camber, is bent from a piece of stainless steel wire to fit the boom, with a hook on one end to hold the sail and a small hook to fit into a hole on the boom. A number

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Wind and Water

by Iain Kirley

AUSTRALIAN NATIONALS

Canberra; 3 to 13 January 1990

These were run on behalf of the AMYA by the Canberra Model Yacht Club on Lake Burley Griffin in front of the Canberra Yacht Club, which gave all competitors honorary membership for the duration of the event. All classes ran smoothly, with only four protests entered during the ten days of sailing.

EC12 - 3 & 4 January

A large fleet of fourteen EC12s lined up in ideal conditions at 1030 hours. However, the light winds of 0 to 1 knots increased to 40 knots late on the first day, and the temperature in the low thirties increased to the low forties in the afternoon. Conditions on the second day were light (3 to 8 knots), with no rain. The competitors sailed as two fleets on the first day and the second morning, followed by match racing on the second afternoon.

RESULTS

Fleet Racing	Match Racing	Overall
1. C. Cooley	1. G. Pyke	1* C. Cooley (NSW)
2. P. Chapman	2. P. Chapman	2* P. Chapman (NSW)
3. G. Pyke	3. C. Cooley	3* G. Pyke (NSW)
6. G. Watson	4. G. Watson	5. G. Watson (NZ)

* All three finished equal first, with the overall places decided on a countback.

R10R; 5, 6 & 7 January

Twenty six skippers competed in this event, including three New Zealanders: David Watson, Paul Chisholm and his daughter Andrea, currently the NZ Junior Champion; and Englishman, David Coode. Conditions for the three days were light, usually 3 to 8 knots. Competition was close throughout the event, with Frank Russell finally getting the better of Paul Santoro on the final day.

RESULTS

1. F. Russell (NSW)	30.1 pts
2. P. Santoro (Vic)	34.2 pts
3. P. Page (NSW)	48.5 pts
4. B. Brunsden (Vic)	59.5 pts
5. M. Bielby (WA)	79.4 pts
6. D. Watson (NZ)	80.4 pts

RM; 8, 9 & 10 January

Thirty three skippers lined up to compete in

this event, including eight from New Zealand and David Coode. Conditions on the three days were light to very light (5 to 8 knots), a temperature in the mid twenties and, you guessed it, it was raining - an automatic advantage to David Coode from England. The hard luck story of the first day was when the battery pack in Andrea Chisholm's boat failed after she had led the A fleet for the first three legs of the course in very fickle conditions. One skipper who deserves a mention is Ben Potter from Queensland. He sailed well above his age, as Ben is only 11 years old.

RESULTS

1. P. Santoro (Vic)	19.5 pts
2. R. Attard (Vic)	42.1 pts
3. D. Baker (Vic)	47.7 pts
4. B. Brunsden	56.1 pts
5. F. Russell (NSW)	64.1 pts
13. D. Watson (NZ)	
18. A. Chisholm (NZ)	
Team Prize - Victoria	

RA; 12 & 13 January

Eighteen skippers lined up, including David Coode from England and two past winners of the event, Pat Cox (5 times) and Rod Clack, the winner of the first RA Titles, in 1976. On the first day only eight races were run, due to light weather; i.e. no wind and plenty of sun in the morning, and light wind and rain in the afternoon. Conditions improved on the second day, with light to moderate winds (2 to 15 knots) and no rain. At the end of the first day there was no clear-cut leader, with at least ten skippers capable of winning. However, on the second day Pat Cox, G. Wiseman and Rod Clack emerged from the pack to grab the first three places. Two of the most encouraging performances were put in by Ron Attard and Paul McGilvray sailing new boats, completed and measured the day before the event started.

RESULTS

1. P. Cox (Vic)	10.4 pts
2. G. Wiseman (Vic)	17.9 pts
3. R. Clack (Vic)	47.4 pts
4. R. Attard (Vic)	50.7 pts
5. D. Coode (UK)	63.0 pts

A.M.Y.A.

Election of Office Bearers for 1990

At the AGM held on 9 January the following office bearers were elected:

President	Hub Bell	WA
Vice President	Rob Guyatt	SA
Secretary	Iain Kirley	NSW
Treasurer	Michael Bell	WA
Registrar	Terry Thearle	NSW
RC Officer	Eric Fisher	WA
Publicity Officer	Bruce Kennewell	NSW

The next Nationals will be held in Adelaide over the period 3 to 13 Jan 1991. The dates for each class have not as yet been confirmed, but the format will be similar to the Canberra Nationals.

NEW AUSTRALIAN ITEMS

With the increased cost of overseas rigging components, two local suppliers have introduced locally manufactured ones. Both suppliers for-



From New Zealand to the Nationals at Canberra, Andrea Chisholm and her dad, Paul, with their RMs, Kiwi designed Hakas.

Modelling is for fun: satisfaction with safety.



This pic goes with the paragraph on Safety. No comment needed. I hate to see this sort of photo!

TRADE NOTES



New carbon fibre pipes from Bolly Props. A 60-40 quiet pipe weighing about 80 grams (half the weight of a comparable metal pipe); plus racing pipes for 40, 21 and 15 engines. Different lengths available. Structure is woven carbon fibre wrapped laminations: rigid. Ring Les (08) 255 9666.

NATS RESULTS

F2D Combat (8)

1. G. Wilson
2. B. Randall
3. B. Greave

Open Combat (8)

1. Richard Bellis
2. Brian Greave
3. Fred Adler

F2C Team Race (5)

1. Wilson-Ellins
2. Hunting-Owens
3. Leknys-Hoogenkamp

2.5 Rat Race (8)

Wilson-Randle	581
Hunting-Ellins	147
Leknys-Adler	147

Open Rat Race (4)

Wilson-Randall	5:11.96
Hunting-Ellins	8:58.51
Fry-Stivey	5:36 (70 laps)

Combined Speed (5)

G. Turna	11.265 sec
N. Kirton	11.930 sec
G. Wilson	12.730 sec

Goodyear (7)

1. Wilson-Randall
2. Fry-Haynes
3. Ellins-Bellis

Bendix (6)

1. Fry-Haynes
2. Hunting-Ellins
3. Burfein-Piper

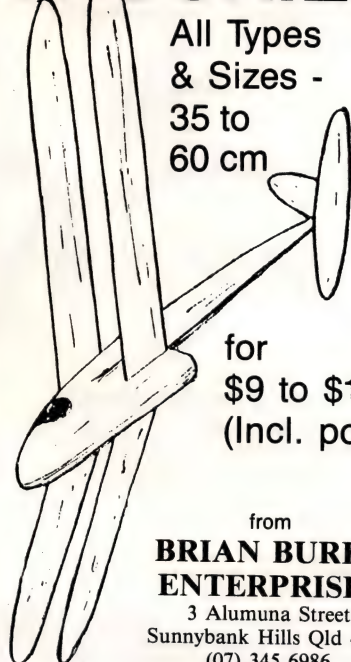
Control Line Champion:

Graeme Wilson

THE ART OF AEROBATICS

Chasing the elusive perfect score in CL Stunt has been greatly encouraged by Art Adamisin who is planning to be in Oz for the Bendigo Nats, possibly accompanied by other US Stunt flyers. Art visited the NSW State Champs in June '88, producing improvements in judging and flying with his discussions. His influence should provide another lift to local competition through his coaching clinics and generous instruction. This will be a highlight of the Bendigo show. Les Bollenhagen talked to Art during his visit to the US (See Airborne No. 97), and Ian Ferris has made arrangements for Art's visit here. Ian may be contacted at Box 1111, Dandenong, Vic., 3175.

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- 4" Threaded Rod slides inside inner Push Rod to give a stiffer exit to Control Horn.
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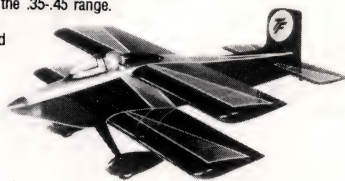
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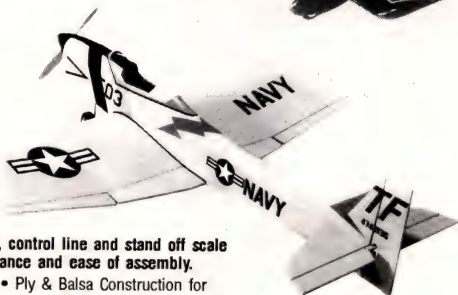
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Engine .35-.45

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Length 47 in. Engine .40
Radio Equip 4-5 channel



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grams for 1st to 3rd generation models, and anything up to 630 grans for those fitting the 4th and 5th generation mold. A winning speed of over 300 kph was recorded at the 1988 Control Line World Champs. The stuff of dreams had become reality. It is not out of the question for any of us to build a Russian minimal model, as Nelson Competition Engines are now manufacturing Russian copy magnesium and aluminium barstock pans. The magnesium version costs US\$45.00. and the aluminium costs US\$35.00. Alternatively, turn your own as described in a recent issue of Aeromodeller.

Barstock Pans: Nelson Competition Engines, Rd2 Box 233 Ramsay Rd, Zelienople PA 16063, USA.

Basswood: Try Australian hobby shops first. SIG Manufacturing Co Inc, 401-7 South Front St, Montezuma, IA 50171, USA.

2024 T3 Wing Sheet (2 x 4 ft sheet minimum): Wicks Aircraft Supply, 410 Pine St, Highland, Illinois 62249, USA; Phone (618) 654 7447.

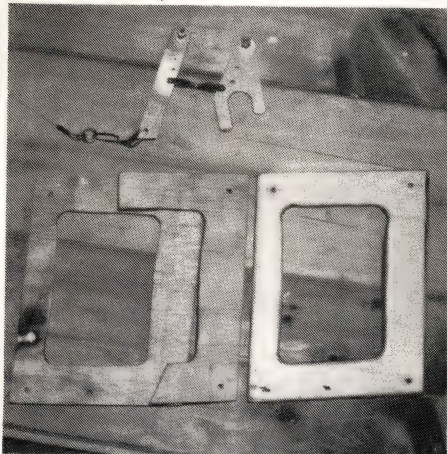
MURRELL 3-LINE HANDLE

David Murrell sent me some photos and information on his home-made 3-line handle (for throttle control). Sorry it took so long to get to print. The nylon quick links operate the 3rd line lever, which **must** be mid-way between the elevator lines, from the trigger. Set up the throttle so that it is closed by pulling the line. Use fishing trace and good quality connectors. Colour code every line end and lead out to avoid embarrassment. David modified the bellcrank shown in AIRBORNE 86. He makes a slot in the throttle crank which fits over a screw set in the mount which acts as a stop so that when you apply fully open or fully closed throttle you can not go too far. Serious scale modellers may still prefer to purchase a commercial unit, but for the average flyer who just wants a low cost unit NOW it should not be hard to make.

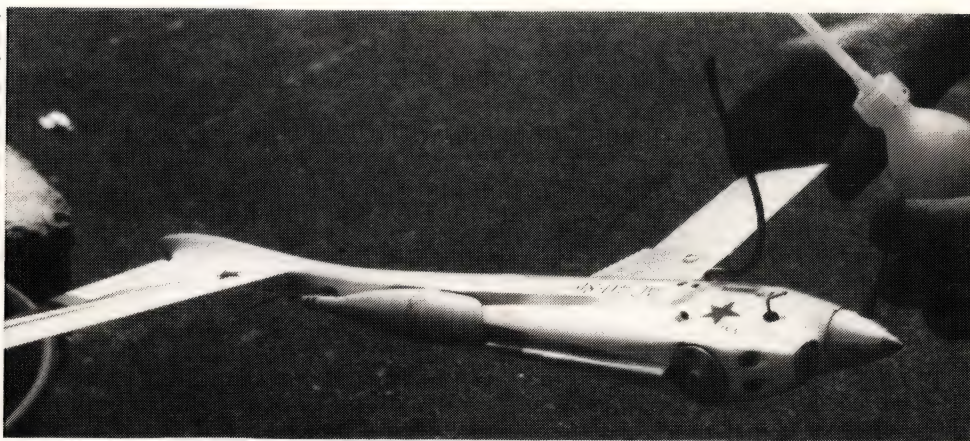
CONTROL LINE SAFETY

Never Fly Near Power Lines. Control Line flyers have been electrocuted on a number of occasions yet, sadly, the message is not reaching everyone. You **do not** have to physically touch the power lines. Don't gamble with your life.

Lines and Connectors. If you use the sliding centre type of line connector, before each flight you should check that the sliding part in the middle is correctly engaging both ends and has not worked its way to one end or the other. Under sufficient line pull and vibration the slide will shift, and either the clip will fail or the line will unhook.



The Murrell 3-line handle. Check function, then dismantle to fully seal plywood parts before final assembly. Throttle is spring-loaded open. One pic is inverted when compared with the other. DM photo.

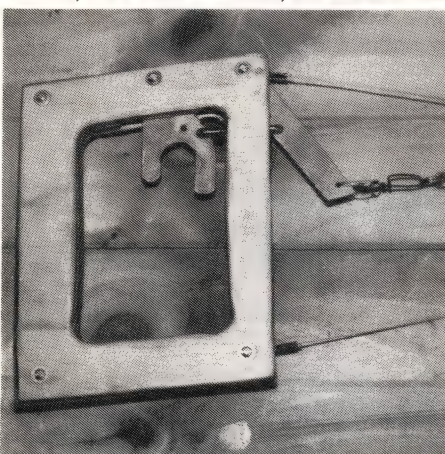


Bulgarian (Tanev's) 1986 World Champ's model. Based on Hungarian concept. Alloy tube pipe air intakes behind engine (bottom not visible), stretched fuselage and Hungarian type pan and wing but split air intake at front. R. Hiern photo.

This type of connector will no longer be accepted at CL competitions run in SA. The scissor opening connectors, like the Sullivan, is the recommended type. Key rings and fishing swivels are sure to fail. Line tests are generally applied conscientiously at contests, but in my experience these are casually done, if at all, before practice or when sport flying. Make it a New Year's resolution to check your lines and leadouts for broken strands where they exit the wingtip, the line end bindings and loops, at the clamp nut of the handle and right angle bend points on reel type handles. Any kinks in the line (a loop pulled tight) also renders the line fit for the rubbish bin. Clean your lines with solvent on a rag. Oily grime causes the lines to stick together giving the sensation of bad control system. This is an unexciting bit of maintenance, but take a look at the photo of the Randall-Lumsden 2.5 Rat engine. Over \$300 damage. Reason for this crash is not known but this is the type of damage you can expect with a line failure on tarmac. I hope the twinge you may have felt at the hip pocket nerve will act as an incentive.

VINTAGE TEAM RACE REVIVAL

Team Racing has not always been as sophisticated or fast as the FAI event is now. The original models have their special appeal that many are finding irresistible, if the growing participation in Vintage Team Race contests (get together) is any guide. In Victoria, at the Knox Vintage Day in June, there were 11 models, and 9 teams flew.



Model designs included Footprint, Pluto, Alien, Time Traveller, Nervesage, Gengangeren and a Tracer (old South Aussie design) (see photo). Brian Deason even had his original 36 year old Mud Runner racer on show. If you would like to build one of these designs you should find construction is not hard if you can build an average sports model. Circle Torque and the Knox MAC newsletter have included reduced scale plans, and John Hallowell's regular Vintage Team Race column in Circle Torque is an excellent source of information. Subscriptions to Circle Torque are available through Peter Harrison, 3 Justin Court, Cheltenham East, Vic., 3192. Check with Peter if he has back issue that have the plans.

Models are raced, but the main aim is fun, and most races are at club grass sites. Rules may vary marginally between states, but all are based on the UK Vintage A rules. Main rules are: Pre 1957 design and motor (except later plain bearing, non Schnuerle e.g. PAW 2.49 DS or any Taipan in Victoria); no mods to model outline; 15 cc tank; no multi function valves or pressure refuelling; 46 ft 8 inch lines; 90 lap heats; 180 lap final.



Brian Deason with his original 1956 Nats winning team racer at Knox Vintage Day. Both model and pilot at least 34 years old! Dislers photo.

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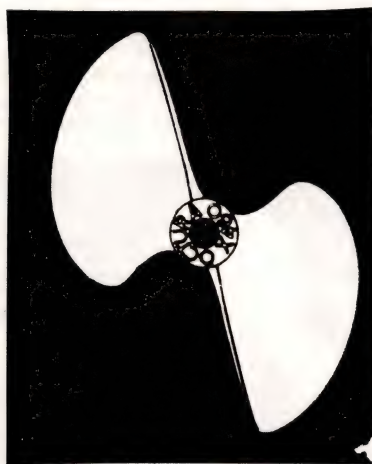
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FAI SPEED — The Model PART TWO

In the previous issue we looked at the design development up to about the level commonly seen at Australian contests. This part examines more recent technology that goes beyond simply making a new fuselage with modern cowl for an existing pan, tank and wing unit.

Fourth Generation - The Hungarian Influence; 1980 to 1985

The Mk 3 Rossi, particularly the early version, was quite a different motor from the Mk 2. The Hungarian team found it would begin to purr at 36,000 to 38,000 rpm, and they got the new engine to work in the air by tailoring the model to suit what this engine needed. Part of their secret was lower drag airframes that really allowed the engine to unwind to maximum rpm after coming onto the pipe. Lower drag was achieved by shrouding an extra 400 to 900 mm of the lines inside the airfoil of their 1.0 to 1.5 metre wings and they still had acceptable pitch stability. (On a speed model, line drag makes up a very significant 85% of total drag.)

Apparently a means to getting good stability at high speed is to prevent any change in wing incidence at the wing root in flight. The higher the aspect ratio of the wing the more critical this becomes. The Hungarian wing attachment system was quite different. The wing panel fitted inside a maybe 50 mm long wing root section welded to the pan, possibly providing greater support than the common bolted-on wing skin over T spar method (see photo). The Hungarians fabricated their wings from 50 mm wide venetian blind slats, rather than folding the wing from .3 mm thick 2024 T3 aluminium sheet. I do not know if this was by choice or dictated by material availability in Hungary, but it is an acceptable alternative. (Sorry, I don't know where to get 50 mm wide venetian blind slats here.)

The Hungarian tuned Rossi Mk3s with larger

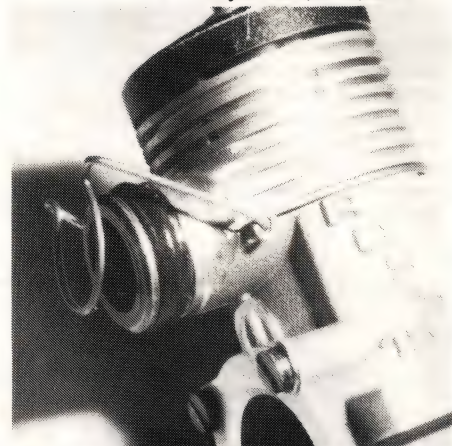
7 mm venturis needed considerable ground warm up and laps to work up to full speed, which used up more fuel. OUT was the small side-winder pan. IN was their own stretched pan. A comfortably roomy unit to accommodate the larger tank in its more inboard position, dictated by the larger venturi. The pan shape best suited a longer fuselage which, by happy coincidence, enhances steady flight. Even so, the longest wing (1.5 metre) Hungarian models were not quite as stable as 600 mm old style models in the wind, but adequate for well practised pilots. The all hardwood construction (possibly for durability reasons as much as rigidity), and larger pan added weight requiring a larger area wing and tail to achieve the legal wing loading. It was a solid, well engineered package, and the engine loved it, but the all-up weight was 630 grams!

Cooling was still by front slot for the engine cylinder, but additional aluminium tubes were fitted proud of the cowl and angled forward about 45 degrees to scoop cool air onto the pipe header (see photo). The engine-pipe system could be screwed out to a higher sustainable peak power setting (small stinger, low pitch, high rpm technology). Not only was there extra power to play with, but some lessening in pipe bending and breakage. Of course, the best third generation features were also utilised. 275 kph was realised and the World Champs and European Champs were won in 1982, 1983 and 1984. Needless to say, these developments were widely copied by the vanquished.

Fifth Generation - Refinements of the Hungarian Concept

The benchmark model of this genre is possibly Anatoly Kohaniuk's 1985 European Champs design. While many attempted to chase speed via Hungarian max rpm technology, the Russians had been making progress via more BMEP or torque while keeping around 36,000 rpm. I think a critical feature of the Kohaniuk airframe was the well aimed air cooling via large, submerged type air scoops onto the engine exhaust fin stack and very front part of the pipe. Engine cylinder cooling on Kohaniuk's model was via side slits in the cowl ducting air to the hot, not relatively cool, front part of the rear exhaust cylinder.

Pipe mounting was better thought out. The pipe could expand all it wanted, being held in place by a wire clip locking behind the header flange and only loosely supported at the rear. (See photo of adaptation of the idea to a Rossi.) The top of the cowl was made removable to give access to the clip and engine, as well as providing the option of experimenting with different cooling arrangements using different cowls. Kohaniuk's pan was machined from solid bar stock, which may seem masochistic, but does yield superior strength, weight for weight, to a cast pan. He took a different approach to tank mounting, suspending his tank on a vibration damped, vertical tube in the pan near the back 1/3 position and flexible coupling to the ram tube fixed in the pan. I can't comment authoritatively on this system, but the bottom line is no cavitation (fuel frothing, in common language) if you want to go fast



McGladdery Rossi Mk3 adaptation of Russian pipe clip. Clip attached to a wire loop around and under fins. R. McGladdery photo.

Sixth Generation

- The Kalmikov 'Minimal' Type; 1986 to 1988

While the Kohaniuk model was very good, the Russian team switched to a totally new construction technique that allowed a very substantial saving in weight with gains in vibration management. Bolt-together components, particularly heavy parts, were minimised by the new mode of construction. The theory was that energy wasted vibrating rattly parts is not available to turn the prop. Whether by accident or intent, it was discovered that glueing the wing panel permanently to the bolt on T spar as well as wing spar made even short fuselage models stable with a 1 metre wing; a different and maybe superior way of tackling the incidence change and vibration problems, but one could not get in to change the lines with this system.

Curiously, the wings on at least some current Russian models built as above are from ordinary soft aluminium sheet (food tray material in the USSR). Spar technology is not known, but at a guess is conventional. Wing length is a moderate 950 mm and the wing aerofoil features a very sharp leading edge, something not easily achieved bending a 1 metre length of 2024 T3 sheet. The new design eliminates the conventional method of holding the pan to the fuselage with bolts. Instead, a relatively light boom and tailplane unit is glued permanently inside a machined ring at the rear of the barstock pan.

The only remaining bolt-on structure is a shorter, lighter balsa two-piece cowl. The inner portion keeps the fuel tank confined in a cavity formed between it and a balsa block shaped to match the inside of the pan. Both parts are carved to match the tank. The outer portion provides streamlining and incorporates even more cooling than before. Do note that the Russian engines have excellent crankshaft balancing and mounts at the front and rear of the case, team race engine style. I can't guarantee as good results with all engines, but the British team have gone Ruski with their Irvine 15s, so it can work with other engines. The Russians use the balsa tank cavity idea with and without foam padding.

The net result with an AAC motor up front is a trim 470 grams compared with the 550 to 580



Minimal model of Alexandr Gulerski (Leningrad, USSR) at 1989 US Nats. Removable two-piece cowl covers only about 30% of pipe. Pan does not detach from fuselage. See text.

Flying

Check that there are no warps in the flying surfaces, and then head off to have some fun at your favourite flying site. With small models like the B.Y.O. test glides are not always conclusive, unless you are lucky enough to have the elusive combination of long grass and calm conditions. Wind on about 50 turns and launch gently. A smooth climb with a slight turn should result; the prototype turned to the right and required no trimming other than weight adjustment. If there is a tendency to climb too steeply under power, or to stall, a small 0.8 mm shim may be glued at the top of the noseblock to increase the downthrust. Corrections for excessive turn

or dive are best made by gentle bending of rudder or elevator as appropriate. When a pleasing, stable flight pattern has been achieved, stretch the rubber motor to about 3 times its normal length and, with the help of a friend to hold the model, or a home-made stooge, wind on a gradually increasing number of turns. Flights of 30 seconds or more are easily achieved in good conditions.

A Larger Model

Most of the designs in the Gumnut series are suitable for scaling up, using a photo copier, to A3 paper (approx 141%). In the case of the B.Y.O. this will give a wing span of 44 cm (17 inches).


The prop will need to be increased to 150 mm (6 inches) diameter and the dihedral at each tip to 30 mm. These increases will make for a very good flying model, especially for father-son and mother-daughter projects.

Don't forget to let us know, c/o AIRBORNE, if you are having any problems obtaining materials. Most of the retail suppliers listed in the back of the magazine have assured us that they will attempt to stock up on difficult to obtain items such as small washers, propellers, rubber and tissue. We've also been advised that the new heat shrink Litespan tissue has been used successfully on Gumnut size models.

COUPE D'HIVER CONTEST

The only postal contest (that I know of) will be conducted once again this June. The rules are simple: flying is done to the FAI format (rounds are not necessary) and a score card (with fly-off rounds if your max out), signed by the timekeeper, sent to me at RMB 1798, Benalla, Vic, 3673. Any day in June may be used. You may send in more than one score, and the best one will be considered for prize giving. To be in it requires only two people. Take it in turns to fly and time. In 1989 there were entries from the three eastern mainland states, and it would be more fun to have scores from all states (and territories).

FREE



NEW MEMBERS WELCOME!

March 10, 11, 12 **STATE CHAMPS**
March 18 **WANGARATTA**
March 25 **COMBINED FAI**
April 1 **FAI FLY OFF**
April 13-16 **GARNHAM TROPHY**
AFF CHAMPS
CANOWINDRA

V.F.F.S. MEETINGS
will be held at Sport Aircraft Association
265 Queens Parade, Clifton Hill, at 8.00 pm
on the 1st Thursday of each month.
Flying Meetings are at Boundary Road, Brooklyn
(Melway reference: page 39, D9).

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CASTLE HILL OPEN 7 DAYS
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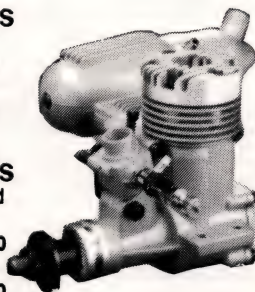
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BYO

The **B.Y.O.**, or **Back-Yard Observer**, is a neat, compact, high wing cabin monoplane with lines akin to the modern military light aeroplane as used by so many of the world's air forces. It is a satisfying project for the stick and tissue modeller, and, lightly built, will reward with an excellent flying performance.

As can be seen from the plan, the layout of the model is straightforward, with mainly straight lines and flat surfaces, so that the challenge to the builder is to construct accurately. As always, think light. Select light, soft balsa for the fuselage sides and tail surfaces, and harder material for wing leading edges and spar. Note that the wing section uses ribs with straight upper edges.

It is suggested that the plan be first photocopied from the magazine page (several copies), to produce, if you like, a set of working drawings which will enable shape transference to the balsa sheet to enable you to proceed more rapidly. This is achieved by lightly spraying the back of the photocopy with water and then using a warm iron to iron the required shapes on to smoothly sanded balsa. By cutting your photocopies into separate components, pinning to small building

Another time saving technique with small model construction is to dope and sand balsa sheet before cutting out the component shapes, particularly with reference to all-sheet tail surfaces, as this further helps to minimise warps with this type of construction.

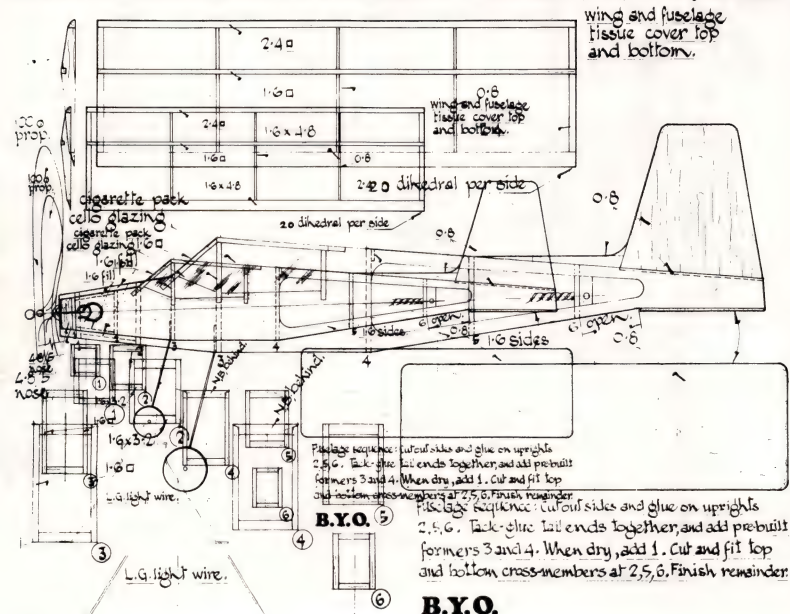
When building the wing, it may help to first lightly sand the shape of the leading and trailing edges before stripping from the appropriate sheet, leaving the final sanding until after the wing panel is assembled. Rib shapes are best cut out and then sanded as a block. The cut-out for the spar can then be achieved by careful use of a metal file, trial fitting for accuracy with the actual strip of balsa to be used for the spar. When pinning down the wing panel, it may also help to position the leading and trailing edges against short lengths of steel straight edge. Some expert builders cut the wing ribs a little over-length at the trailing edge so that a very accurate fit can be obtained when glueing the rib into position. White glue (PVA) is very suitable in wing con-

When the wing panels are complete they can be lightly sanded and then covered with tissue of your choice, once again using white glue thinned with water as the adhesive, applied with a small brush to the outer edges. Water shrinking of the tissue is best done after the wing panel has had ample glue drying time, using the technique of spraying the water vertically upwards and then passing the wing panel through the finely falling mist. This will usually give sufficient tightening without warping the structure. When dry, thinned dope may then be applied to seal the tissue and help resist the effects of moisture. When both wing panels are thoroughly dry, sand the inner ribs to allow the panels to be propped up and glued at the correct dehdral angle (approx 20 mm at each tip).

Fuselage construction is detailed on the plan. Proceed slowly and carefully and a good straight fuselage will result. Nose block construction is best achieved by first accurately measuring and cutting the plug to fit the opening at the front of the fuselage so that a good friction fit is achieved. Position the plug in the opening and then, using cyano-acrylate (super glue), glue the nose block (cut slightly oversize) to the plug. Allow a few seconds for drying and then sand the block to neatly fit the lines of the fuselage. Drill the nose block for the propeller shaft bush (nylon or thin metal tube) at a slight angle to give approximately 2° down thrust and 2° right thrust.

Decoration for the B.Y.O. can be achieved by using coloured tissue, felt tip markers or a lightly applied airbrush paint finish could be used to give a camouflage effect. Assemble the model carefully, checking particularly that the wing sits at the correct incidence angle (about 3°), the tail-plane at 0° and all surfaces square. The wheels can be light plastic or cut from balsa, held on the axles by a tiny drop of balsa cement. The rubber motor can be made up from a strip of 3 mm (1/8"), approx 44 cm in length. Tie the knot and then lubricate the rubber in the palm of the hand using either hair shampoo or glycerine. Fit the propeller on the shaft using a couple of small washers and a drop of light oil, to ensure smooth running.

Balance the model with the finger tips at the spar position, adding small amounts of plasticene (usually inside the nose block) until the model sits evenly or with a slight nose-down attitude.



87

FREE FLIGHT TOPICS

passed an opposing model the cry of "Two green cyalumes over here" or something similar was always heard, so models were rarely lost. The night was balmy and clear, and looking up one could see twinkling stars and green cyalumes ... and hear the sound brear ... brear ... brear and smell the occasional waft of smelly fuel, truly majestic to any modeller. Since Peter was short on batteries, and the moonlight wasn't too bad, I did quite a bit of chasing for him with the torch off. I can remember thinking on the last run "Gosh; this is right over the other side of the paddock.. yep, that is where the cars park .. the fence must be coming up soon!" Next instant I was upside-down with a mouth full of grass and one leg in the air behind me over the fence ... didn't feel a thing! (That's exactly what happened, OK, so we can all stop embellishing the tale, can't we?)

Peter's Xmas tree light show ... er model, was parked on the top of a roadside tree, unretrievable. Jim McFall's plane had come to rest somewhere nearby, so we went to look for that and discovered it floating in a nearby irrigation channel, in two pieces. Jim had designed it to float, and it did, but the motor was totally submerged. So there were two competitors out of the event. During the rest of the event many travellers on the South West Highway parked and watched this madness for a while, and then moved on. One, apparently a large truck, stopped further down the road, and it suddenly dawned on Peter that this was right beside his tree'd, and still glowing, model. With a cry of "Oh, my Mills!" he jumped into his car and was off,

arriving on the scene just as the truck pulled away. The truck did a U turn and returned. "Do you know of anyone who might have lost a model aeroplane?" was the question from the cab. Well, the model was returned to the flight line with two minutes remaining. We had spent over twenty minutes trying to get that model out of the tree and couldn't budge it, so how did they retrieve the model undamaged in about 90 seconds flat? This account fails to record many of the silly things that occurred during the event. One thing is certain though: everyone thoroughly enjoyed the occasion. Funtastic.

Night Scramble (16)

Greg Voak	958
Bob Craine	724
D. Jeffree	679

Indoor HLG (7)

Grant Potter	49
Jim McFall	39
Greg McLure	39

The last day of the Nats had the Seaplane events. Radio was a serious affair, but free flight and control line; silly, silly, silly. Free flight was a match between Ivor F's floatplane, Tomboy, and Jim McFall's float equipped flying wing. Ivor's plane had been a complete failure for its previous owner, but equipped with a wing from a somethingorother it was a majestic flyer. On its last flight it was nearly lost out of sight, but luckily I was close enough to my car to make a mad dash after it.

Control line was a match between Ivor's float equipped .049 powered Doonfly and Jim McFall's

majestic throttle controlled floatplane. Ivor's Doonfly was a true surprise; the little thing flew like the dickens. However, the local populace became quite irate at these antics and one of their number latched onto Ivor's big toe. If you can picture a chap hopping on one foot in calf deep water flying a control line floatplane, and trying to fling a Blue Manna Crab from the big toe of his other foot, you've got the scene. Didn't crash, but lost the event to Jim McFall for exceeding the maximum limit set for mirth.

The Saturday evening brought the Nats to a close with a truly enjoyable Dinner and Trophy Presentation and the last of the free flight events. This was what else? ... paper aeroplanes. I doubt that a single menu sheet escaped the event, and more than one of us found our soup delivered with a Lithgow aeromodeller's winning entry floating in it!

Free flight Champion of Champions was Peter Scott.

The most gratifying part of Free Flight was the high level of sportsmanship evident among the competitors. Each assisted the other with repairs when a cheap win could have been obtained by not assisting. A timekeeper could be had at almost any time from among the competitors simply by asking. This does not mean that competition wasn't in earnest, simply that by confining competition to the flights the events became a real pleasure for all. Sportsmanship at its best. This Nationals did not have a slogan, but was described by all as the Friendly Nationals. May the Sportsmanship be evident at this level always.

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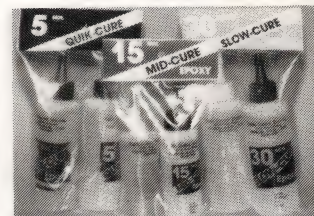
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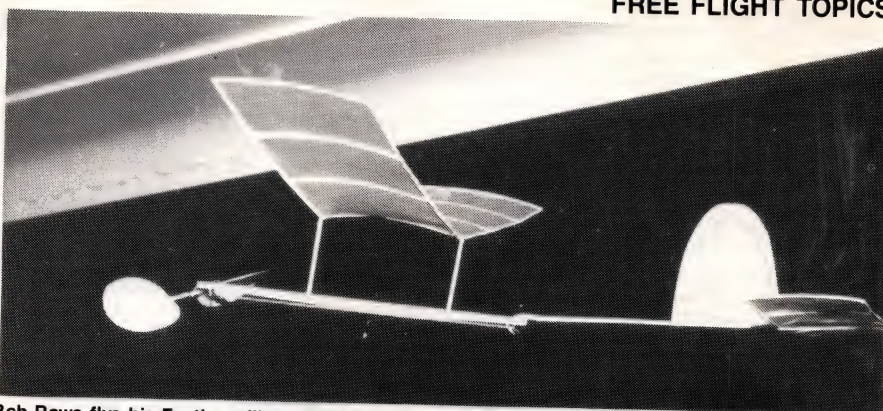
On Thursday morning was **Day Scramble**. What a hoot! The Aeromodeller scaled down Simplex was popular, with a number of competitors fitting slightly longer wings with polyhedral. Other designs were Mpunga, Ivor F's wire winged wonder the Pteradactyl, Jim McFall's neat high thrustline job and Tim Haynes' Angel by Pete Somers. Peter Scott had me running all over the place with his power model, which promptly lost a wing panel, then another, on his knee, and ended up as a somewhat erratic tandem winged thing. The cry "Heeeeads!" was heard on a number of occasions as models changed direction in the breeze and cruised through the flight line amid much ducking and laughter. Ivor's Doonside Mills powered Pteradactyl (how many others have made their model AND the motor?) was never far away, with its dropping-weight DT permanently deployed 'cause it flew better that way. I doubt that it ever managed more than 50 feet from the flight line. The sweetest flyers on the day were Peter Easdown's and Bob Fry's Simplex models and Jim McFall's little machine. Peter's model was lost miles downwind when the DT timer failed. The very consistent flyers won the placings, though, surprisingly, Peter Scott's badly damaged model ended up only a few seconds behind 4th place.

Day Scramble (14)

Robert Fry	1394
Jim McFall	1071
Ivor F	1066

On Friday morning **P30** and **Hand Launched Glider** were run by Jim Stivey, with myself as CD because we thought Jim would be called away for CL Speed, but he wasn't. The events were flown without rounds, and first away were the chuckies. What amazing performances were extracted from the best trimmed of them. Graeme Sharp and Gregg Voak both had arms and arms of launch that placed their chuckies about 50 feet up at the end of the throw. Straight up! However, the ability to pick thermals in the breeze was the deciding factor for a win; i.e. the most consistent thermal sniffers were the winners.

The importance of dark colouring of a chuckie was emphasised when one max was lost. The timer could no longer see the balsa-coloured glider against the background and had to click off the time only to watch amazed as the launcher retrieved from half a paddock further away than its supposed landing spot. Peter Scott's bright dayglo orange chuckie was also quite visible way off in the distance, though faded dayglo colours were as bad as uncoloured chuckies.



Bob Rowe flies his Fantham flimsy in his lounge room. The model was designed for the Vic Smeed Encyclopaedia, and is an excellent introductory model for EZB and indoor techniques in general. Prop diameter is 70% of the wingspan! Bob is as good with the camera as he is with models!

At the end of a most enjoyable event a junior (entered in both junior and senior) had blitzed the field with a perfect score.

HLG [Senior] (15)

Grant Potter	180
Peter Scott	160
Theo Merrifield	148

HLG [Junior] (3)

Todd McGuffin	107
Benjamin Jones	42
David Stivey	23

The P30 flyers had quite a trial in the gusty conditions, and many were thankful for the unlimited attempts under 20 seconds allowed in the P30 rules. The importance of timkeepers in an event was pressed home to Ivor when he launched for one of the few maxes of the event and then found that the intended timer hadn't finished the previous task. Ivor's own time for the flight could not be accepted, and the flight would have been lost. To the rescue came a bystander who had clicked his watch on for a partial time as Ivor's model entered a thermal, just to see how long it would do. One of the encouraging things to be seen among the flyers were the new modellers giving the event a shot; the kids and mothers who normally take a back seat to dad's activities. In the end the partial time was still good enough to give Ivor the event.

P30 Rubber (6)

Ivor F	198
Geoff Potter	158
John Haren	136

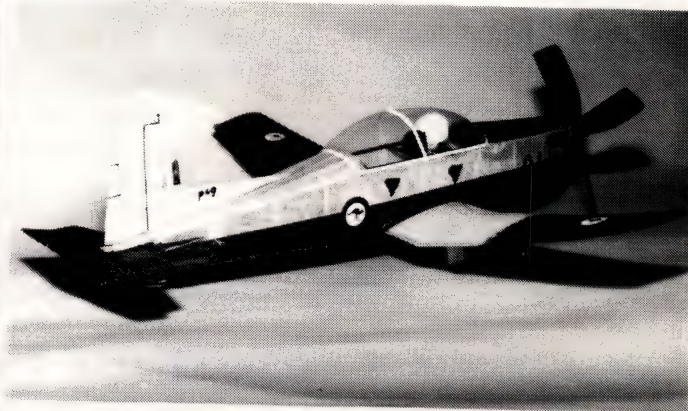
The Friday night had **Night Scramble** and this was even more of a hoot than the Day Scramble. Jim Stivey was CD and decided to postpone the event for half an hour to allow full darkness to fall. On announcing this and the closure time, a protest at the half hour duration was heard from many. "But night scramble is normally a half hour event." A chorus of boos was heard. "Do you want to run it for a full hour?!" Such was the bonhomie that all the contestants, all the timers and most of the spectators raised their hands. "You're mad; you're mad ... OK we run it for the full hour" and a chorus of Hoorays was heard. The timers were sorted out and Phil Garstone took over as CD to allow Jim Stivey to compete.

The event was hilarious. Peter Scott had the most easily seen model during the trimming flights, but right at the start gong the brand new nicads decided to go flat! After much muttering and describing of suppliers, it was found that the timer's torch had the same sized batteries. Some incredibly funny pleading led to a swap, and Peter was away. It was hard to hear the "heads" calls for the laughter at times, and quite a few strays cruising through the flight line were seen only at the last moment. (You may be horrified at the thought of injury, and actually two modellers did collide with models. Neither received anything more than a surprise. The scramble events have remained largely unchanged in 30 years, and as long as the event is confined to the currently used small diesels, the event will remain as amusing as it has always been.)

During retrievals the true reason for the success of the event became apparent. As a retriever



Free flight rubber scale model at the Nats, photographed by John Bellamy. Nice 3-bladed plastic prop.



The Stevenson Pilatus PC9 Peanut. A bit of up elevator to carry that large prop, it seems. Air Marshal Funnell would be amused by this one!

Modelling is for fun: satisfaction with safety.

FREE FLIGHT TOPICS

by Merv Buckmaster

THE NATIONALS

from Howard Jones F1A (Nordic A2 Glider) at Talbots Field

The morning started with a very light breeze which rolled thermals across the field. Neil Pollock enjoyed these conditions well, with 3 maxes for a perfect score at the end of three rounds. Graeme Sharp was very close behind, with Ivor F in good form and the others working their models up to good trim. Ivor had the most unfortunate, though thrilling flight, when his A2 flew into the last carriage of a passing high speed goods train. He repaired the shattered nose and replaced the lost ballast weight with rubber bands and an 11 mm spanner, and pressed on like the veteran campaigner he is.

The wind came up and caused many troubles. Neil's light weather A2 suffered flutter problems and times went down. Graeme's model refused to launch straight for many tows, and Craine's A2 clapped hands at the top of a perfect tow to end its campaign. The railway continued to exert its magnetism and lured Neil's model into a level crossing sign. His next flight ended with the model 30 feet up a tree. Graeme 'Possum' Sharp climbed the tree and recovered the model. Just another example of the sportsmanship between competitors.

Tow after tow augured in for most of the others, leaving them with poor scores. Graeme identified the drag of some torn covering as his problem and put in an amazing max in the blustery conditions for his last flight. This would have given him first place, but Neil was patient and stood through thermal after thermal until just the right moment then launched for an adequate flight to regain first place.

F1H Glider (Nordic A1)

This was run at the same time as A2, and won in fine form by Graeme Sharp.

F1A - A2 Glider (7)

Neil Pollock	675
Graeme Sharp	642
Ivor F	512

F1H A1 Glider (3)

Graeme Sharp	480
Stewart Craine	471
Graeme Wright	276

Peanut Scale.

Only the SE 5A of Victor Longbon and the Dauntless of Greg McLure had been flown before the Nats, and the six flight, NO attempts rule kept scores well down. No competitor had an opportunity to test fly because of the limited time available in the stadium (expensive hire) and as a consequence the times were even well down on what we expect under our low ceiling (4.9 metre) gymnasium. We must remove the limitation on the number of flights or we'll eventually remove the competitors.

After Peanut we returned to **Hangar Rat** flying or, for a few of us, retrieving from the rafters, for the rest of the evening. During this time Dave Axon came up with the best method so far for deraftering a model. The method is to hold a ball of plasticene, about golf ball size, just in front and below your belt buckle, then launch it vertically upward. Catch the ball each time and adjust your position on the floor to correct. When the plasticene reaches the model it has lost most of its momentum so the knock it delivers to the model is very gentle. It didn't break any of the Hangar Rats that were retrieved this way. One to remember. The flying was fantastic.

David Stivey, Todd McGuffin and Benjamin Jones are juniors and, judging by the number of flights they each put in, they and their mothers had a ball. David and Benjamin came 4th and 5th. Charlie Stone's best time was with a

plan's length of aged 1/8 FAI rubber with 1450 turns eventually put into it. Neil Pollock couldn't get his model finished in time and borrowed Peter Scott's second model and beat him (err ooops!).

Just compare Hangar Rat with Peanut for a moment. Peanut rules allow only six flights, Hangar Rat unlimited. There were actually 124 timed flights put in in Hangar Rat, and the three times as many entries as in Peanut. Methinks Peanuts might have a subtle change to the rules petitioned soon. And finally from Indoor, a pat on the back for introducing a most successful indoor event goes to MAX STARICK ... Bravo!

Peanut Scale (6)

Victor Longbon	Se 5A	63.80
Howard Jones	Comper Swift	60.60
Richard Bloor	Turbulent	55.60

Hangar Rat (17)

Charlie Stone	243
Neil Pollock	232
Peter Scott	216

The next morning had **Open Rubber** and **Open Power** run in a breeze stiff enough to have an F1C ship with a 5 second engine run and 2 second DT land way off the field. Sorry to say I was asleep after the late night before and didn't get to see the competition. (Must be age; I could last all night once ...)

Open Rubber (6)

Peter Scott	533
Guy Bateman	524
Colin Crowley	452

Open Power (5)

Peter Scott	595
Neil Pollock	454
Theo Merrifield	230



Dave Thomas and his Swiss Miss. Lovely day at the Amberley Nats. Photo: John French.



Bill Thomas and his Handasyde monoplane at the Amberley Nats free flight scale. On the day it refused to fly as well as it normally does. Photographer French must have pulled a face to get Bill to smile!

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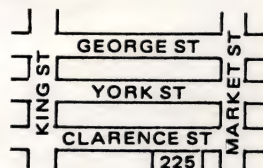
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A Mighty Barnstormer, the Boddington design, by Patrick Blair. This seven footer came out at 14 lb for its OS 90 FSR. Covering is Coverall with Dulon finish. Smart red and black flash on white aircraft. Futaba radio controls include flaps and glider towhook release. Photo by Bill Cooksey.

Jim Hunt with an A1 glider called Simplicity, at the Waikato FF Champs. Flying is simplicity itself: just launch the model in a thermal! Photo by reporter Ackery.



NOTES

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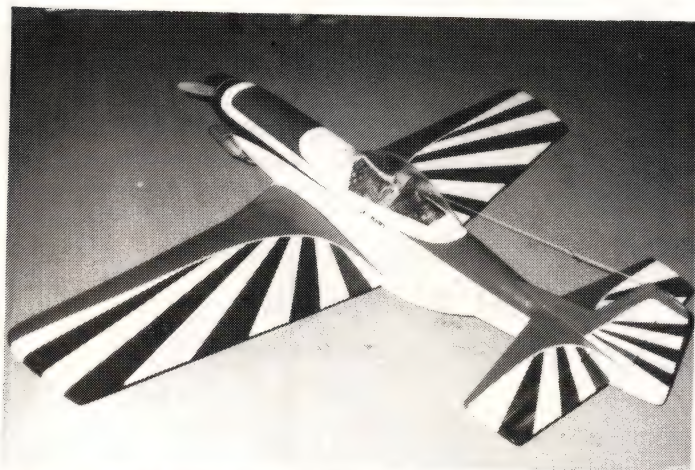


Right. Paul Squires about to release his Flying Aces Moth, scaled down for the Vintage class at the NZ Indoor Championships. Flights were about one minute.

Left, Noelene Craighead, the New Zealand Team Manager at the Pattern World Champs, with Keith Jennings. Photographer de Chastel says the Kiwis were well organised, and Noelene was always calm and competent.



NEW ZEALAND



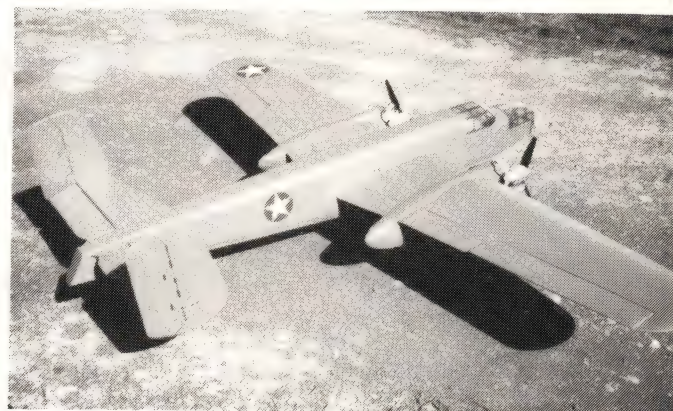
A Junior Mustang from a Gordon Homewood kit by Bill Cooksey Junior. Scale is 20%; weight 3.86 kg; powered by a K&B 61; guided by 6 channel Kraft radio. Has flaps and Rhom retracts. Covering is Worldtex with Dulon finish in red sunburst on white with blue leading edges. Bill Cooksey Senior photo.



Another Bill Cooksey double. Bill Junior did this Sig model of the Liberty Sport, silk covered it, painted it with Pactra dope, powered it with a Webra 61 and guided it with Kraft radio; and Bill Senior took this nicely posed photo. That's a Bartels 10 x 7 GRE prop.



Mike Briggs' PT19, in the scale US Army Air Force colour scheme of blue and yellow with the red and white barred rudder, is 2.28 metre span and weighs 7.27 kg. Power is from a Webra Bully and it has Futaba 4 channel radio control. Photo W.C. Cooksey.



A twin by Bill Cooksey. This one a B25 from the Royal kit powered with OS 35s and 10 x 6 Zinger 3-bladed prop. Covering is Worldtex with a Dulon finish. Kraft radio control includes flaps and Rhom retracts. Cowls yet to be installed. Cooksey pic.

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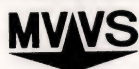
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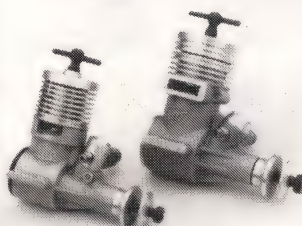
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KIT REVIEW



Underside of the Thruster hovercraft showing skirt arrangement. Foam base plate has circumferential holes for air supply. Partitions for balance indicate years of development.

This is something which is new, very innovative and a lot of fun. Also, it is Australian designed and manufactured. Developed on the tidal flats of Westernport Bay, and attractively constructed from light vacuum formed plastic, this small model is equally at home over water, sand or any flat paved surface, carpet or finely cropped lawn (not rough mown grass).

Measuring 520 mm long by 380 mm wide, it is powered by a small Mabuchi 380 swinging a 4½ inch diameter plastic prop. The draft from the motor is partly diverted into and under the craft to provide lift, while the balance streams over the large rudder to provide thrust and directional control.

As supplied with motor, prop, rudder and linkages, it weighs about 350 g. To this you must supply radio receiver, rudder servo, battery and some means of switching or, preferably, throttling the motor. All up weight is then about 775 g with a standard 6 cell Sub-C nicad. I tried it also with

a 7 cell 900 SCR pack, and a 5 cell 450 AR pack, and in all cases it lifted easily onto the hover and shot off at such a pace that I had to throttle back before it ran into something. The point is that it is plenty powerful enough, and in the end I stayed with the standard 6 cell Sub-C pack.

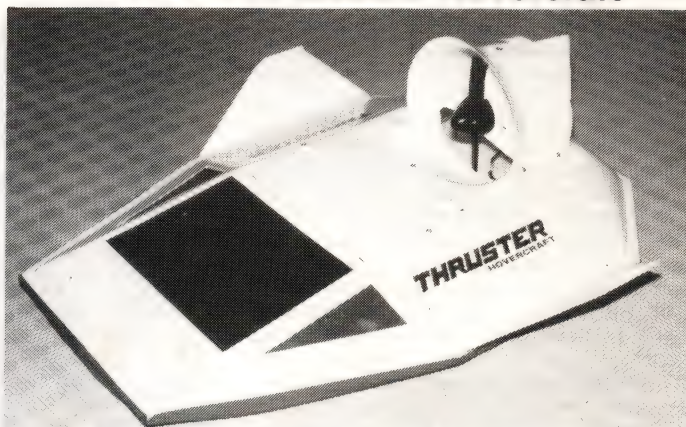
The model has a clever skirt design which separates the underbelly into two chambers, keeping the craft on an even keel. Construction consists of attaching the parts of this skirt and screwing on the motor mount-rudder assembly and the propeller shroud, then installing the RC gear. It should take less than an hour.

The model is too fast for inside your house. I had a lot of fun on the local bowling club car park which has a rough bitumen seal.

I also tried it on water, and with some extra fins attached to the skirt steering is much more responsive. It will handle a small surface chop of up to about 50 mm, but any more and progress is greatly impaired, with the prop throwing up plumes of spray. Obviously you need to put the

THRUSTER

Silver Sea Electric Hovercraft



The electric powered hovercraft designed and developed by Peter Keogh. It is 520 mm long, 380 mm wide, weighs 500 gram, and is powered by a 380 motor and standard 6 cell nicad battery. Two function radio is said to be optional, but would complete a fun package.

Rx in a sealed bag for this. For water use the positive buoyancy necessary comes from a base plate of 10 mm rigid foam, so even without power it will not sink. The base plate has vent holes strategically placed to distribute the lifting air.

The third surface that I tried was a solid wooden floor of an auditorium. This proved to be the most exciting, as not only did it provide the best seal for the air cushion, but it also was the most slippery when it came to the "stop it before it hits something" power off slide!

As you might have gathered, I really enjoyed trying out this model. So did everyone else who had a go. The challenge is in learning to steer it. Except on water where there is some grip, all turns are merely controlled slides, and if they are not controlled they can easily develop into uncontrolled spins. Basically, the rudder determines only where the craft is pointing, not by any means, necessarily, where it is going! The throttle can be eased back to provide some resistance to sliding by reducing the lift, hence it is much better to have a car type proportional throttle.

There you go. Something different for anyone with a bit of flat space and a yen for a different, racy model. Highly recommended.

P.S.

Sample supplied by Silver Sea Hovercraft Design, 400 Agar Road, Coronet Bay, Vic., 3984.



Ready for lift off. Surface is rough sealed roadway. Thruster copes easily. Radio needed for rudder and motor speed control. Manoeuvring requires anticipation and practice!



Hovercraft motor installation. Top segment of airflow for rudder and yaw control; bottom segment is ducted under the body to provide the air cushion. Prop shroud is for safety. Note flared inlet.

required to carry the class of sport for which it is issued; ours is Class F) and there is again a proposal before this year's Council Conference to issue a different form of membership card. The current card is in the form of the FAI Sporting Licence. It does not require a photograph even if you are competing in an international contest or attempting a World Record, but it does require an FAI stamp for those. The MAAA supplies the stamp at no cost, although other bodies charge about \$13.00.

Noise 1. Also while in South Australia, I had the opportunity to visit three club flying fields in the company of the SAAA President, Leo O'Reilly. At each of the fields Leo showed me a register of the models flown by the members and the noise level of each model with the size of the propeller fitted at the time. The noise had to be below a set dBA figure, and the model was not permitted to fly until it was at or below the limit. In the case of all models that exceeded that limit, a reduction in propeller diameter, with a necessary increase in pitch, or a change in brand of propeller, reduced the noise to within limits, even with .60 size engines.

Noise 2. I have a copy of a paper prepared for the Academy of Model Aeronautics on the matter of noise caused by model aircraft. It is fairly complex and has been redrafted in simpler terms for publication in Model Aviation. The first part was printed in the December 1989 issue of that magazine. A large part of the article sets the scene, explaining propeller theory and noise measurement, but it suggests that "the propeller noise may be the dominant acoustic source in model aircraft". Included is a table of results of four groups of propellers. It shows, for example, that an 11 x 6 propeller turning at 8500 rpm at 90 kph had an overall sound pressure level of 92.5 dBA. A 9 x 7 propeller from the same manufacturer, turning at 8700 rpm at 90 kph, had 83 dBA. It seems that South Australia has the answer to making models quieter. Should anyone want a copy of the paper I will supply it on request for \$2.00 to defray the cost of photocopying and postage.

Ron Chidgey's Visit. Ron Chidgey, the Chairman of the CIAM RC Aerobatics committee, visit-

ed Australia in November as the guest of the Association. He conducted judges' schools in Queensland, NSW and Victoria, with a total of thirty six members attending. The schools were basically similar to those Ron has conducted in Europe and the USA. Firstly, the different methods of judging were discussed with those attending.

Terms such as impression judging, penalties, perfection, placing and precision were introduced. Then each manoeuvre was described and the errors earning downgrades explained. The manoeuvres were broken down into straight lines, arcs of circles and rolls, with the points to

be looked for discussed in detail. Finally, a model flew the manoeuvres some three or four at a time. These were individually scored by the judges who then explained what they had observed and why they had given the score they had. The pilot of the model quickly learned where he made mistakes and, more importantly, Chidgey explained how the manoeuvre could be improved. In one case the pilot gained at least one point a manoeuvre after a short critique. I consider that the visit achieved its purpose, and I hope that the council will approve a further visit in two years time. I am also told that three schools based on the Chidgey style will be set up.

Club List. Below is a list of affiliated clubs in Queensland and the ACT. Those in the other states and territories will be included over the next few issues.

Club List on page 81.

WILLIAMSTOWN HOBBIES

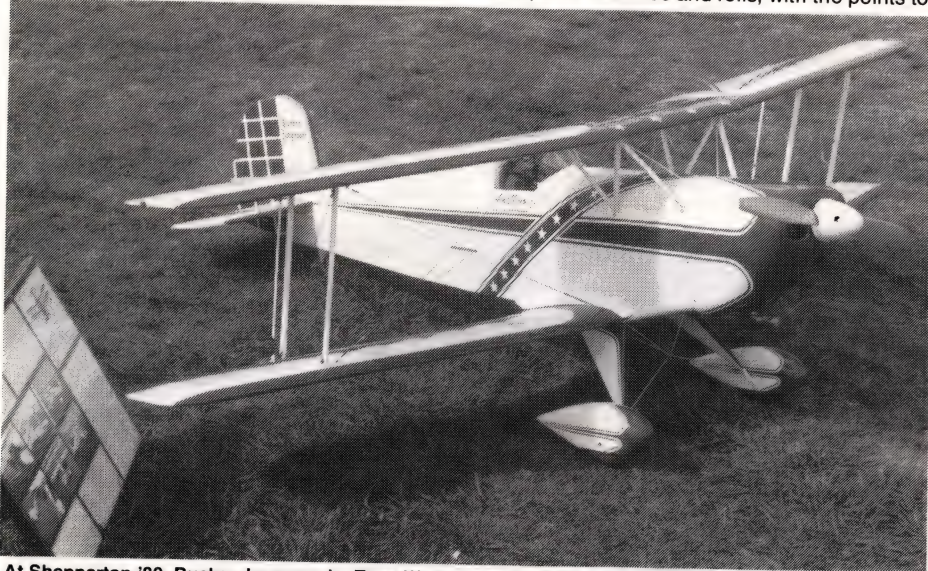
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RCAS held a special dinner to honour MAAA members of special status who live in New South Wales. Presentations were made by the Presidents of the FF, CL and RC Societies. Shown are: John Chadd, President RCAS; Mike Comiskey, President CLAS; Bob Carpenter, Life Member; Bill East, President NSWFFS; Bob Rowe, Hall of Fame; Jack Finneran, Hall of Fame; John Marquette, Life Member; and Alan Martin, Hall of Fame. Wives of the special guests were also present and the occasion was organised by Val Vickers, who sent the photo. *What a great idea!*



At Shepparton '89. Bucker Jungman by Terry Wade, from the RCM plan, to 1:3.5 scale, giving span of 2.13 metres and length of 1.93 metres. Engine is an ST 3000 for weight of 9 kg. Radio used is Futaba Gold. Covering is Solartex and the finish is Dulux auto spray enamel. The pilot has a hand-sewn leather jacket and the nav. lights are wired for power. The full-sized version is owned by Jim Moser, and was previously owned by Henry Haigh, noted USA aerobatics pilot. A superb model. Photo by Gerard Power.

Protect your right to fly model aircraft: join an MAAA affiliated club.

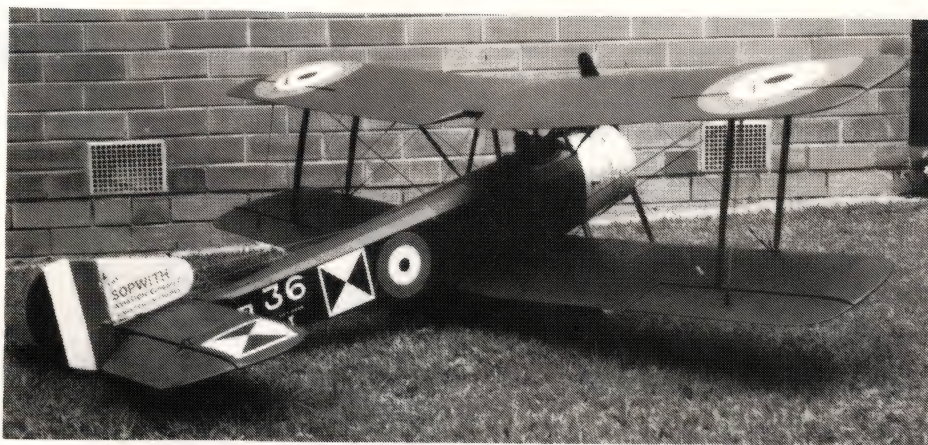
MAAA NEWS

ment, both transmitter and receiver, to a testing station for checking if it does not carry the appropriate stickers indicating that the retailer has already had it certified for bandwidth. I should point out that equipment operating on our approved frequencies is required to meet Dept. of Communications and Transport specifications and should carry a sticker showing compliance. A sample set would have been submitted to the Department for testing to the specifications. It would appear that quality standards have since slipped. Certification by a testing station will cost \$15 to \$25 and, while I acknowledge that it should not be necessary, it will reduce the possibility of radio problems.

Rules. Some would-be contestants in Open Combat at the recent Nationals were not permitted to fly because their models did not conform to the rules. The relevant rule, which requires that the engine tether be two strands of wire instead of the one required for F2D (FAI) rules, was introduced in 1988 and was printed in Change 3 to the Rule Book. The lesson is that if you are going to enter competitions it pays to have a copy of, and to read, the rules. The same comment applies to the flying of manoeuvres. For example, it is an unfortunate fact that some manoeuvres flown in different scale events have the same name but different descriptions. The Touch and Go is a good (or bad?) example. The Scale Masters rules, which are not in the MAAA Rule Book but which is popular in Victoria, require aircraft fitted with a tail wheel to have that wheel in contact with the ground during the touch and go. The FAI rules do not. The MAAA Rule Book is available through your state association. Also available are metal badges, cloth patches and water slide transfers.

Membership. Despite frequent warnings in this column about the need to check, non-financial, and hence ex-members, are still being allowed to fly at club fields. One Melbourne club was recently represented in a major annual event by a non-financial 'member'. It just should not happen! There are probably some non-members who could meet the costs of any injury or damage they caused, but not many. Most of us need the public liability insurance cover. May I again remind you that the Underwriter requires that any incident likely to give rise to a claim be reported, even if you believe that a claim will not be made.

National Aero Club. The Australian Sport Aviation Confederation (Inc) is now the National Aero Club recognised by the FAI. The MAAA(Inc)



Gary Sunderland's latest! A Sopwith 1½ strutter to 1/6 scale. Power is from an OS 61 2-stroke and the mass is 5½ kg. Details of structural and covering materials are a military secret. Or lost in the pages of ancient history, perhaps! As usual, the model is superbly done in all details.

has ended its membership of the RFACA (after at least 36 years) and has paid the fee of \$2.00 per member for 1990 to ASAC. The Executive Director of ASAC is Harvey Ritchie, a real live-wire with enthusiasm to see sport aviation take a higher profile than at present. He believes that model aviation is the stepping stone to other branches such as gliding, parachuting and ultralights. It may have been once and, if we could see CL fields close to towns, it could be again. At present a surprising number of members are ex-glider pilots or hold a private pilot's licence, and have found that model aviation is as challenging but less expensive.

Government Grants. The MAAA(Inc) applies each year, without success, to the Australian Sports Commission for a grant to assist competitors attend World Championships. Model aviation is classed as a recreational activity and not as a sport. Because of our membership of ASAC we have been given \$1,000 towards attendance at meetings overseas, but this is part of a grant of \$10,000 to ASAC for that purpose. However, while I was in South Australia on my way to the Nats, I was told by Bob Steer, the President of the Port Pirie club, that his club has been given a grant of \$5,558 by the Australian Sports Commission under the Community Recreation and Sporting Facilities Programme towards the development of rain catchment and an amenities block at their field. The application emphasised an involvement with youth, and was handwritten and not typed (said to be important).

A Break with Tradition. For many years the FAI was lodged in the building of the French Aero Club. Meetings of the various FAI commissions, including the aeromodelling commission (CIAM), were held in the Aero Club rooms. It is impossible to describe fully the grandeur of that building. True, the staircase creaks, there is no lift and the ceiling of one room did collapse about six years ago, but the doorways are ornamented with gold leaf, the ceilings have elegant cornices, also with gold leaf, the walls are hung with pictures of famous aviators and with posters of historical interest. There are numerous bookcases filled with all sorts of titles, fact and fiction. Alas, rising costs have forced the FAI to find new offices and a meeting venue. The meetings will now be held on the other side of the Seine, not far from the Eiffel Tower, in the Railways Institute building. We will also have to find a new watering hole to replace the Galilee, a restaurant in Rue Galilee close to the Aero Club, where matters were resolved amicably.

The Sporting Licence. I reported in the last issue that, because of the change to the FAI Statutes, I now have to send Sporting Licences to Canberra to have an FAI stamp affixed when one is required. The matter has been clarified such that it need not be done if the licence carries the name of the National Aero Club as well as the FAI logo. Ours has neither, and I still have two years supply of blank licences. I should also tell you that ASAC is considering a common licence for all aviation sports (although the licence is



Andy Payne sits on the bottom wing of his Tiggy, resting in the shade after refuelling. At the Lockyer Valley club field. A friend waits in the front cockpit. Photo from Arthur Gorrie who, being a Master Toastmaster, is to be believed, whatever he says!

John Willis with a Basic Biplane. Neat little machine with an OS 61 4-stroke. Nice Constellation Club decal on the wing. Howie photo.



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Technical Secretary: Ron Ericson
Secretary-Treasurer: Chris Greenwood
6 Coppelius Close,
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MAAA Phone No: (03) 744 5915

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RCAS(NSW) 1941 TMAA(Inc) 136
CLAS(NSW) 92 SAAA(Inc) 535
NSWFFS(Inc) 66 AWA(Inc) 497
ACTAA(Inc) 142 NTMAA(Inc) 52
for a total of 6599, the largest-ever membership at that cut-off date.

Errors and Corrections. The dates given in this column in the last issue for the Annual Council Conference were wrong, and there is no way that I can correct my mistake; by the time you read this the meeting will be over. The meeting is to be held on February 10 & 11. At least the mistake was a safe one in that if anyone was misled and turned up a week early, they would have been able to come back the following weekend. I apologise for any inconvenience caused.

43rd National Championships. These were held at Bunbury, WA, with 130 individuals entering nearly 40 events. Thirteen juniors competed. The NTMAA had members flying in RC Sportsman Aerobatics and Scale; MAAQ in CL; NSW, VMAA and AWA in all categories. The weather was fine and warm. The 'noisy' RC events were held at the field of the local club about 35 km out of town. The OT and FF events were flown at a farm about 30 km out. RC Glider and Electric were flown on a sports field in Bunbury, just outside the Competition Headquarters. Most CL events were flown a few hundred metres from the Headquarters, while the Indoor competitions were held in a basketball stadium nearby. An estuary was the site for the Seaplane events.

The Adventures of Ivor F. [I was going to call this section Notes on the Nats until I realised that Ivor F was mentioned in every one.]

A railway line runs alongside the field used for FF for the Nats. A glider flown by Ivor F flew into the side of a passing train with no noticeable effect on the train, but smashing open the ballast box of the glider. Flights were completed with

a spanner taped to the nose as weight. He placed third!

Ivor F's open power model, fitted with a vintage Elfin 1.49 motor, suffered a DT failure. It was last seen at about 2000 feet and a couple of km downwind. That flight was a definite maximum (180 seconds). The same Elfin earned Ivor a Nats Award of a butcher's apron because he was seen to use a pair of pliers on the propeller nut.

During the seaplane event two competitors, Joe di Giorgio and Ivor, were bitten by crabs. (Had the venue been Kakadu it might have been crocodiles.) Ivor started to build his model for CL seaplane late the previous night.

At the auction, with Ivor as auctioneer, \$20.00 was paid for an empty box that once held a Taipan diesel. The buyer knew that it was empty. Beware the collecting bug! (Now, if it had been an old copy of Aeromodeller, Model Aviation News or Air Trails, I could understand it.)

At the Nats dinner, Norm Kirton exorcised an 'electronic curse' that had been placed on you-know-whose car at the previous WA Nats. The placing of the curse was described on page 60 of the March 1988 issue of Model Builder in a poem by Jim McFall. Its effect was to cause car fuel problems on the way back to Sydney in 1984. This year Ivor again had fuel system problems on the way to WA, progressively replacing, at service stations across NSW, the ignition condenser, the fuel pump and other components, until blowing out the line between the filter and the tank cured the problem. I hope the trip home was uneventful!

Ivor listed his history of Nats attendances on his entry form. The 43rd Nats was the thirtieth consecutive Nats in which he had competed; it seems that he missed the 1959 event. He has attended all six Nats hosted by WA, and calculates that he has travelled 120,000 km at a total cost of \$40,000.

Interference 1. In 1969/70, when I flew models

with some friends at a turf farm near the RAAF Base at Richmond, we learned to avoid flying over a pumpkin patch at one end of the field because of severe glitching. At the 43rd Nationals two models, both on channel 10, crashed into a swampy area adjacent to the flying field. I have read somewhere recently (but I cannot find it; I subscribe to 13 model aviation magazines) that a patch of moist ground in an area of dry ground, or a large metal surface, can reflect the transmitted signal which the receiver then interprets as an interfering signal. It would seem that our models glitched on 27 MHz AM but generally flew out of the zone. PCM sets go into the fail-safe [?] mode. Does this supposition have any basis? Whatever the reason, a beautiful model of a Lysander was badly damaged, although enough remains to warrant a rebuild.

Interference 2. While visiting the Constellation field in South Australia, a newcomer arrived with a brand new radio and model. The radio was on 36 MHz and used amplitude modulation (AM), which is permitted by the Department of Communications and Transport. After thorough checking by a very knowledgeable modeller and flyer, the model was launched and trimmed before the transmitter was passed to its owner. He was coping very well, with the model flying straight and level, when it suddenly entered a lazy spiral dive; it did not respond to the transmitter which had been quickly been passed to the instructor. While the model was not badly damaged, the day was spoiled for the beginner. The cause of the radio failure could not be determined - it worked perfectly after the crash.

However, there have been reports that the receiver of the brand involved is not of the quality of the transmitter, in that its bandwidth is exceptionally broad (over 50 kHz has been mentioned). While I would very much like to name the brand and model, prudence dictates that I should not. Therefore, I urge that you take your new equip-



Peter Muxlow of Holdfast MAC with his OS 90 powered, 1/4 scale Bucker Jungmann at the Constellation Scale Day back in May '89. Don Howie with the camera.

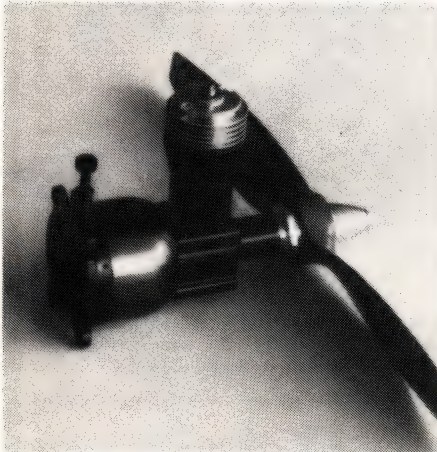


Tom Christensen, right, with his magnificent Sopwith Camel, at Bundaberg. OOD briefs Tom on sortie details. Note wing leader pennants on struts. Pic from Arthur Gorrie.

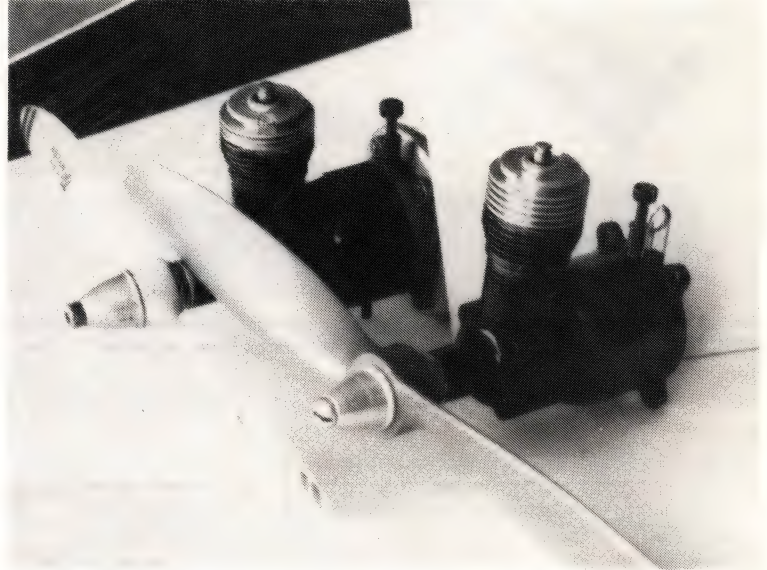
COX 1/2A TEXACO 049

Engine Review

Imported and distributed by Southern Model Supplies, Daw Park, South Australia.



Comparison of Cox Black Widow and Cox Texaco engines. This BW has prop screw from Jim Bocckinfuso in New York. Tornado 6 x 3 makes Cox 7 x 3 1/2 look large.



New Cox 049 Texaco engine has all the traditional Cox quality and performance adapted to special long engine run, lightweight radio control models; Old Timer replicas and powered soarers are most suitable.

This special engine arose from the success of the 1/2A Texaco event developed by the Old Timer modellers in the USA, and becoming more popular in other countries. The 1/2A Texaco rules required a Cox 049 reed valve engine, and the standard 8 ml fuel tank providing enough engine run for a good flight. The model has to be a scaled down Old Timer, and a wing loading of 8 oz per sq ft (these are Old Timer Units) results in a model small enough to be economical for cost and space, but big enough for performance that the 049 can manage.

To increase the engine run and make it easier to get max flights, larger props were used and the Black Widows began to overheat and blow heads. To ease these problems, Cox developed this 1/2A engine. It has a larger head with two more cooling fins to cope with the lower rpm with

larger props, and a reduced bore intake to keep the intake suction high for consistent engine runs. A special 7 x 3 1/2 propeller is supplied with an extra prop bush to ensure good prop centering as an aid to balancing. The reed valve is retained by a plastic cover instead of a wire spring, and the prop driver has an hexagonal flange. There is no start spring, although the 049 spring system may be added.

SPECIFICATIONS

Displacement: 0.049 cu in (0.8 cc)
Weight bare: 53 gram
Length: 75 mm
Height: 59 mm

The engine is nicely boxed and has 2 spanners so that the head may be removed in the proper manner, and 2 Cox decals are included with the standard Cox 049 instructions.

The 1/2A Texaco 049 is a little taller than the Black Widow, but in other respects is the same. With the 7 x 3 1/2 prop supplied it turned over readily, being free on all bearing surfaces. The fuel tank has a very small air vent hole beside the filler tube and the needle valve is in the usual central position on the backplate mount. During testing the amount of fuel that the tank would accept varied from 7.2 to 7.7 ml, as measured by syringe.

Starting was always easy: after priming through the exhaust slit one flick would get the engine running. Two or three primes usually got the fuel drawing from the tank and the rpm would pick up, and keep going. The needle valve seemed to be a little inconsistent, and there was a bit of vibration at low rpm. Performance improved with each tank of fuel and it soon peaked at over 10,000 rpm, well above the manufacturer's figure.

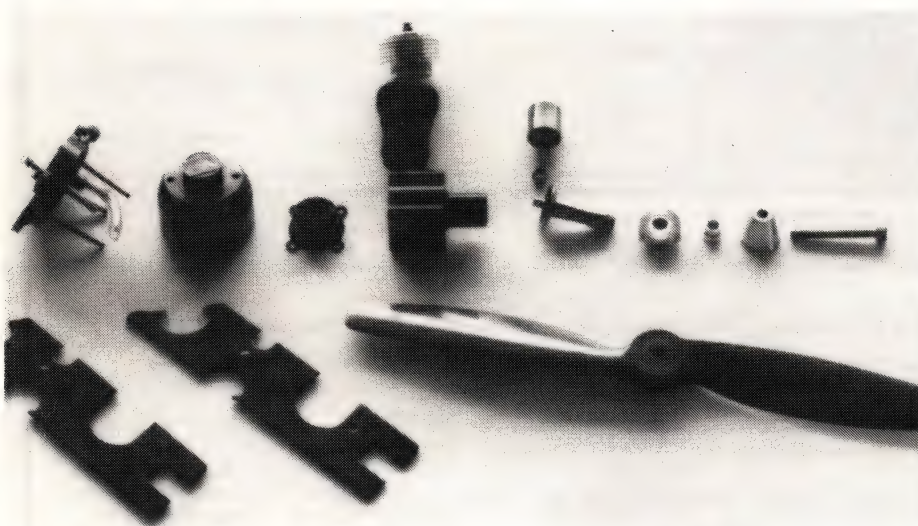
With 1/2A Texaco flying the key to success is a long, consistent engine run. Testing gave the following results:

Prop	Fuel	Run	RPM
Cox 7 x 3 1/2	7.5 ml	3 min 53 sec	10,000 variable
Y&O 8 x 3	7.4 ml	5 min 08 sec	6,000 variable
Taipan 8 x 3	7.4 ml	4 min 03 sec	7,000 steady
Kretchner 7 1/4 x 2 1/2	7.2 ml	4 min 07 sec	10,500 steady

The above figures were obtained with 10% nitro 17% oil in the fuel. Using 15% nitro and 25% castor oil improved the behaviour in that on the Cox propeller the engine ran steadier near top revs for just on 4 minutes. This is a better performance than the Black Widow and should make the 1/2A Texaco 049 a popular engine for all models in this class, not only the 1/2A Texaco Old Timers. It should be available in hobby shops now.

Test engine was supplied by Southern Model Supplies.

M.B.



Parts of the Cox 049 Texaco: standard style backplate and tank; new reed valve retainer; usual crankcase and cylinder; enlarged glo head; usual crankshaft, piston and con rod; special prop driver and prop bush; standard prop nut and screw. Prop is special 7 x 3 1/2. Two spanners and two Cox decals are included. Good value.



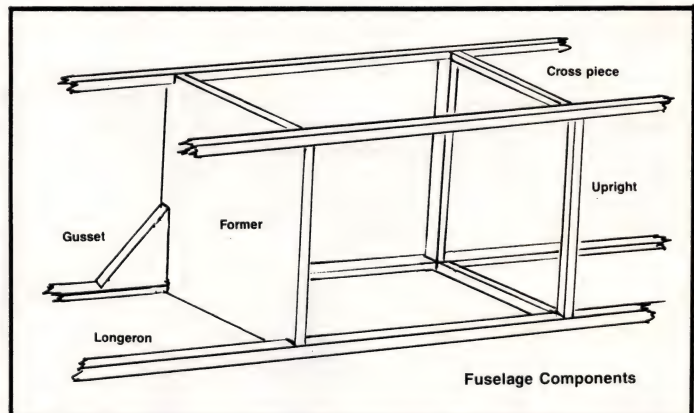
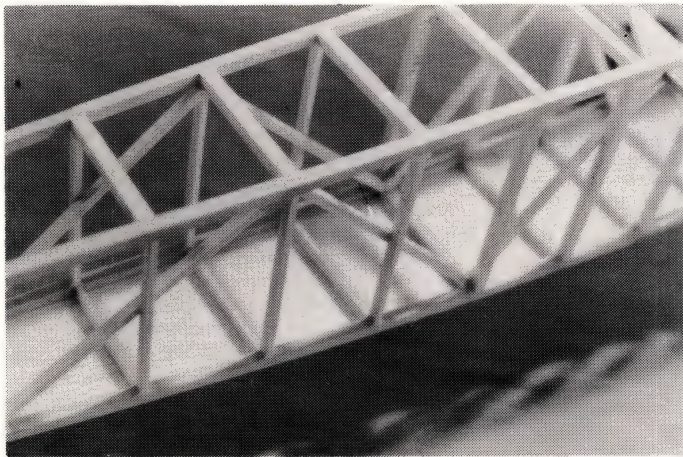
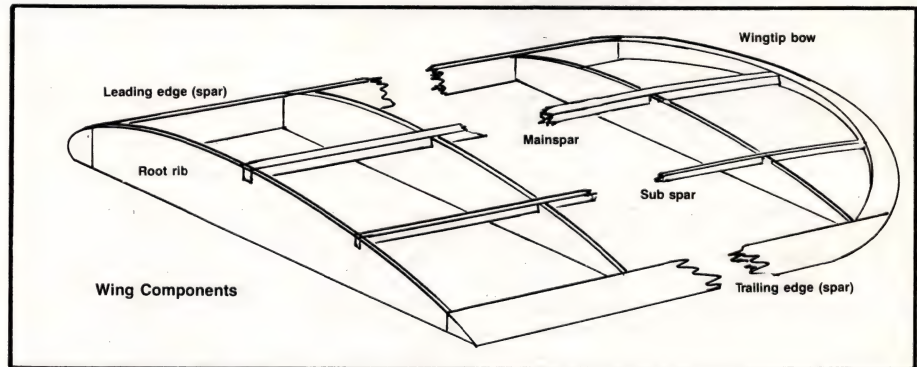
Practical lead weights for use on the building board: lead shot in double plastic bags, ring, folded sheet, small bar and large bar. Cast your own special sizes.



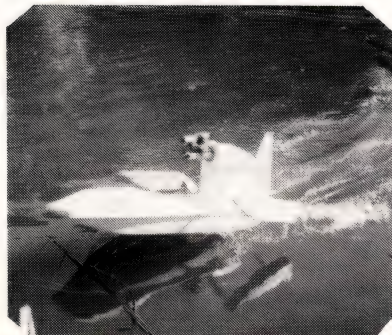
Equipment for holding pieces together while the glue dries (or the epoxy sets). Pins, rubber bands and clamps of different styles. Try each sort to find the most suitable and then add to the collection as finances permit.

that is, the shape of a component as would be shown by cutting through it. Remember also that different names may be given to the same component; e.g. former (aircraft) or bulkhead (ship). A good memory for names will make reading plans much easier.

Fuselage structure consists of side frames built on the plan joined by cross-pieces. Soft sheet bottom gives protection from stones and scratching grasses.



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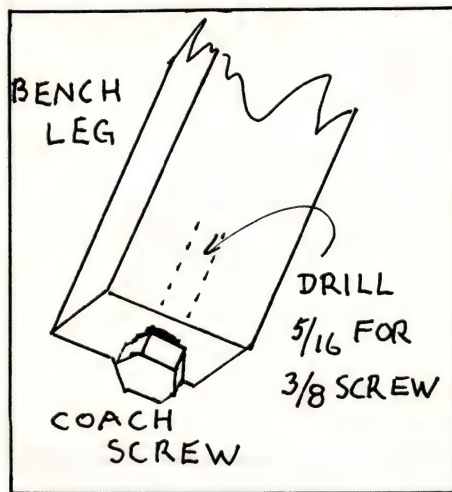
TO BE MODELLED

by Vin Masters

Episode 3

REVISION (and More)

Episode 1 dealt with setting up a work bench, and John Inall of Emu Plains, NSW, wrote in with the suggestion of using coach screws instead of wedges under the legs to level the bench. The method is to drill the bottoms of the bench legs to take 3/8 or 1/8 inch coach screws, which can be obtained at a hardware shop. The screws should be set almost all the way into the wood, leaving enough space between floor and leg to get a spanner in to adjust them. Check the adjustments with a spirit level on the bench top.



Thank you for that very neat idea, John.

Other contributions to this learning process will be welcome. Please send them to me c/o the Editor at RMB 1798, Benalla, 3673. I'll pick them up when I call in, or the Editor will send them on.

In Episode 2, when cutting stripwood was described, I could have mentioned the idea of gluing small patches of fine abrasive paper to the straight edge so that it would not slip during the cutting process. This is an idea you should try out. To be able to use the straight edge in all situations, for example, cutting short lengths or near the edge of a narrow sheet of wood, the anti-slip paper may need to cover nearly all the straight edge, and on both sides. This would be awkward if it is also a steel rule with markings on both sides. Cutting stripwood is the only way to get the strip to the exact size needed, and it soon becomes very helpful to have straight edges of different lengths. They may be purchased at good hardware shops as the need (or birthday) arises.

CORRESPONDENCE

Another letter, this one from Don Howie of Adelaide, provided a comprehensive description of how to become a model aircraft flyer, particularly if you are going alone. Don based his proposals on the idea that many AIRBORNE readers do not belong to clubs since they live too far from such organisations, or do not wish to participate in group activity. Don advises such modellers to start with a powered glider style of model.

Powered soarer, please Vin. We discussed this when going through the Electric Flight column for No. 97. Hopefully you can teach the newer modellers some respect for appropriate terminology!

This approach also applies to people returning to modelling after a long break spent bringing up a family or on work commitments. Although this group have past modelling experience, they may not have a lot of money to spend as retirement draws near.

Although the best source of advice for the newcomer is a model aircraft club, there should be enough information available in the magazines, and that applies particularly to the advertisements, for the remotely situated would-be flyer to be able to become established with the minimum of expense. Mail order suppliers are very important at this stage.

Don recommends a 4-function radio set, unless a 2-function set from a model car is available. He also stipulates nicad batteries, due to the unknown state of charge of dry batteries from day to day. The engine should be small for the sake of economy, leaving the choice of an electric system to the flyer. The aircraft should be a two-metre glider since these designs are well proven, are not expensive and are most suitable in size and performance. Australian kit designs include the Aeroflyte Brolga, Pricerite Quiet Advancer and Model Flight Stepp 2.

The MiniDrake from the AIRBORNE Plans List is also suitable.

Once the equipment has been purchased, building the model can proceed. This will not be dealt with in detail at this stage, as the assembly, finishing and flying instructions with the kits are usually very good. The quality of kit materials should enable a satisfactory model to be built. Problems that do arise may be solved by asking another modeller for help or by writing in to this column. Remember an SASE!

Don covered all aspects of going it alone in his letter, and further stages will be discussed in the next episode.

START SAFETY NOW

Modellers soon become shapers and smoothers, taking off the rough spots to improve the looks and function of their models. Whether the material be wood, plastic or metal, or whether the tool be knife, file or sandpaper, DUST is produced. The combined odour of balsa dust and dope used to be the enticing odour of the model shops of years ago, now replaced by air conditioned blandness.

There is no strong evidence to show that dusts are dangerous to health; but there IS a low level risk, so start the practice of doing the dust-producing jobs outside, in the open air. Shaping a balsa airframe is particularly bad for breathing. Even if the damage may not appear for many years, do not start the process! To be able to do dusty jobs in any weather, a sheltered place like a carport should be convenient. If it is too cold or wet to work outside, leave the job for better weather. Protect your health for the latter years when you retire and have lots of time to build and fly models.

TECHNIQUES

Assembling the parts of a model requires that they be held in place while the glue dries. The original method was to bind the pieces (wood and wire) with cotton thread and smear the glue on before and after binding. The use of balsa made it easy to fasten pieces to the building



A portable standing bench to keep dusty jobs outside where natural air conditioning reduces the chance of dust inhalation. Be clever, and be safe too!

board by hammering dress-making pins through, or beside them. With shaped components and cyanoacrylate glues, assembly may be done in the hand, in mid-air, so to speak.

Pins were commonly nickel plated brass, short and fat. Now thin steel pins are usual. Some have coloured plastic knobs, enabling them to be pushed in by hand. Pins will be glued into the wood by PVA, aliphatic and cyano; they need a strong twist to loosen them before pulling them out. Balsa cement does not cause this problem.

When pins are inadequate, such as for hardwood, bending or thick pieces, clamps usually cope. Spring loaded wooden clothes pegs, bulldog clips and small G-clamps are readily available. Sometimes special modelling clamps are sold in hobby shops. Rubber bands and masking tape are also useful.

Pins and clamps may be replaced or supplemented by weights. Lead is best, and may be shaped to suit special jobs. Lead shot in plastic bags can be very helpful. For big jobs, steel bars are used.

Tooling Up

Read through the section on techniques again and make a list of the items that you expect to use for your next project. Pins are a must-have; clothes pegs are easy; clamps can be added when cash is available. Weights may be salvaged from different places: don't forget blocks of wood and the common house brick!

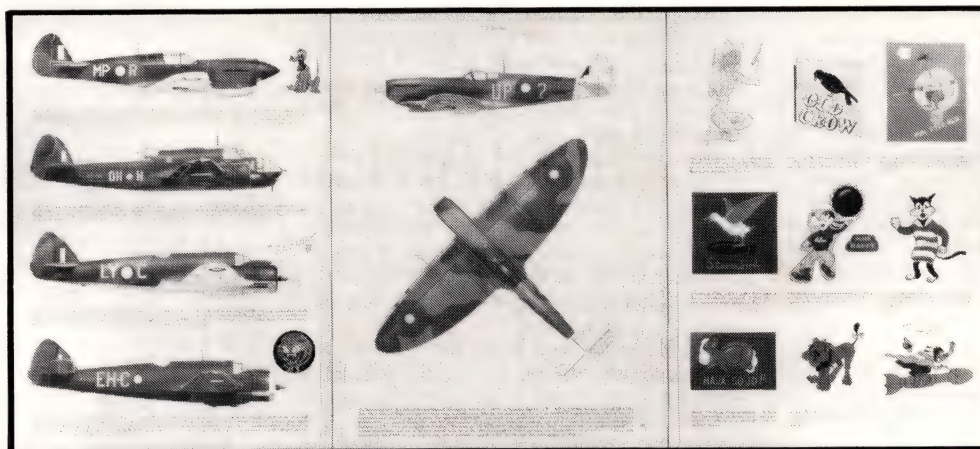
COMING TO TERMS

In Episode 2 I dealt with macro (larger sized) components of a model aircraft, so the next step is to move down the scale to the structural components of the airframe. These are set out in the diagrams. The basic parts are simple: long ones are called spars and short ones are distinguished to correspond with their places. A very important aspect of these terms is that of a cross-section:

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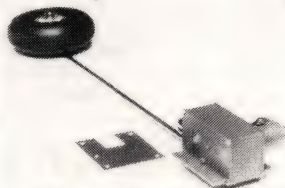
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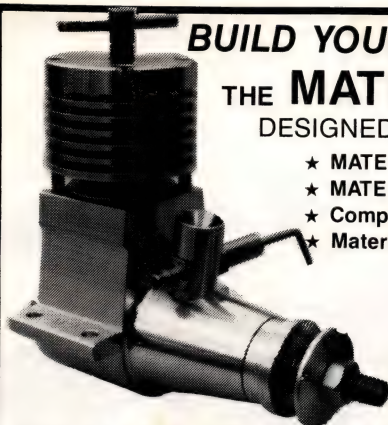
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RESULTS

1. B. Steele	1082
2. J. McKissack	988
3. E. Rich	986

FAI

Brian Steele also won this event. This made three in a row. He has set a new record; no-one has ever done that before. He also had the best time with 1:23, with his Little Toni model, Magic Muffler and OS engine. The results were not decided until after the final round and re-runs, as Eddie Rich and Garry Davidson were locked together only 3 seconds apart. Garry had a cut in both the last round and his re-run, to let Eddie into second place, by only 2 seconds.

RESULTS

1. B. Steele	1018
2. E. Rich	942
3. G. Davidson	940

Those who attended enjoyed themselves and stated that they would like to go there again.

TUNING 11 SIZE ENGINES

I received a letter from Stephen Amos who is having some problems with his OS 10 FSR. He wishes to improve its performance, and is also experiencing starting difficulties. He thinks that it will not be competitive against engines such as the Rossi 09. Stephen does not have a lathe, so he cannot manufacture special heads.

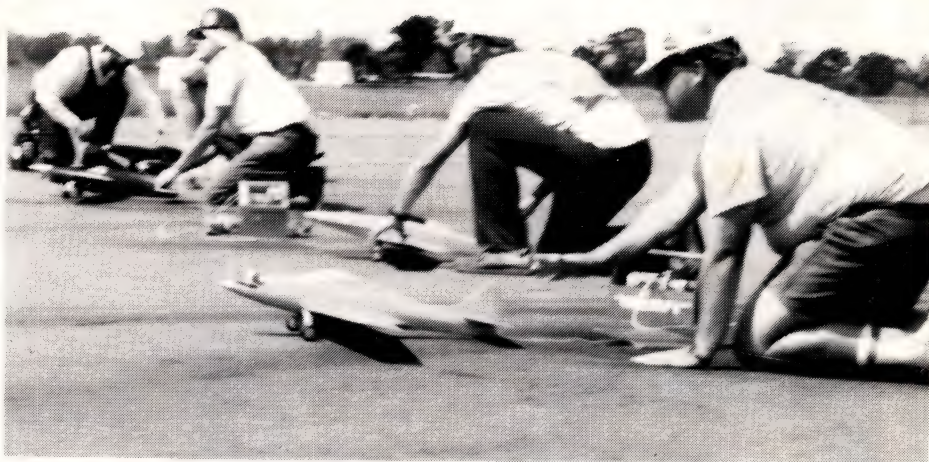
Firstly, there is nothing wrong with the OS FSR engine. Richard Leitch has one of them going as hard as any engine available. I don't think there would be any difference between the OS and the Rossi. In the early days of 1/2A I ran an OS FSR, and for a few meetings I was unbeatable. I achieved considerable lift in performance by removing the head washer and running an OS No. 1 plug. This was done because this engine is factory set for nitro fuels. Our rule for 1/2A is for FAI fuel which has no nitro and is made up from 20% castor oil and 80% methanol. This no nitro fuel needs a higher compression to operate efficiently.

You can also improve the performance by drilling out the inlet venturi slightly. Don't go in with too big a drill, as an extra millimetre in diameter is all that is required. Pressure for the fuel is best with a take-off positioned in the middle of the back plate. I make up my own nipples from 2 mm

At the Amberley Nats, Lance Langham's QM taking off with David Garner pushing. Power from a modified Cox Conquest. If you were there you'll know the other mechanics on the runway.

brass tubing. I squeeze the end with a pair of pliers until I can just see light through the end of the tube. You need a very small hole here. I then solder a lump onto the nipple end to stop the fuel tubing from slipping off. The back plate is then drilled and the nipple is stuck in with metal epoxy. I feel that Stephen's main problem will be the wrong plug and the lack of compression. Also check that the needle hole in the venturi is pointing downwards.

There is a large increase in performance for you guys who have a lathe available. All you do is modify Rossi 15 No. 2 plugs by machining them down to the diameter of the OS cylinder bore. The head combustion shape need not be altered. You then play around with head shims to get the correct compression. Start with approximately 12 thou. Use a tachometer when bench running. The highest rpm reading is usually an indication that you have the correct compression.





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Peter Jordan from Swan Hill at the '88 Pylon Bonanza. FAI Pitts Pellett model has ST engine with OPS conrod and Andy Kerr pipe. Black wing tips and red and yellow check is classy! Hughan photo.



Bolly's Vipers. Rear one is the Mark 2 with larger fin and higher aspect ratio wing. Tailplane outline has been squared off, too. Both models have Super Tigre X-11 engines and 6 x 5 props. JR radio. Les sent the photo.

PYLON ROUND-UP

MORE ABOUT THE 1989 WORLD CHAMPS

I have attended a couple of talks by David Garner about what happened at the last World Champs. There are a number of points raised that were of interest to me and I think that many others would be interested too.

* Australia is applying for the Air-Olympics for 1993. This is a World Championships involving three classes: Pylon, Aerobatics and Helicopter. The site proposed is Drage Airworld, Wangaratta, Victoria, which was used at the last Vic Nats and the '89 Kraft Masters. It is an excellent site with excellent facilities.

* The Japanese had very fast aircraft. They were mostly running Waldeck tuned OPS engines. They were not flying a tight course; possibly because they have only one race meeting scheduled each year.

* The Belgians were also very fast, with Super Tigre engines.

* For various reasons the top German pilots were unable to attend the World Champs.

* In general the Europeans were experiencing difficulty with the hot, humid weather conditions. Many featured fully enclosed pipes. This caused over-heating, and some engines were cooked.

* Prior to processing there was some discussion about who was going to protest against two American aircraft which were a Mustang design without a crank on the wing. No one did, so the Yanks protested against themselves to clear the air! The jury did not view the models, but ruled that the crank would not be seen in the air, so therefore it was okay. So the protest was defeated

and the Americans were able to fly their straight wing Mustangs with confidence.

* During processing the scale rules were ignored, three views were not submitted, no cross sectional areas of fuselages were taken.

* Molina, the Czech ex World Champ, turned up with a model that was supposed to have cheek cowl. These were made out of 1/4 inch balsa, which is far from being scale, and he was allowed to fly without protest.

* After racing, placegetters had their engines processed, but only the last one they raced with. The other engines that were used remained unchecked.

* There was no scoreboard available at the racing location so contestants could not see how they or they teams were progressing.

* Practice fields were 1 hours drive away, and were rather rough.

* Roger and Bruce were supplied with very dirty fuel, and suffered massive fuel blockages. This nearly cost Australia its second place.

* Dub Jet had the lead for two days.

* Dave Shadel, the USA World Champion, ran an Australian, Andy Kerr styled pipe, and picked up an extra 1,800 rpm.

* The Europeans, apart from the Czechs, had their engines tuned for colder conditions and had problems with the hot weather.

* Dave Shadel tried fixed and retract gear on his Mustang and said his times were identical; so retracts are not worth the trouble.

* There were only six re-runs during the Championships, five of which were given to the USA team. Dave Shadel was granted a re-run after a very poor engine run. It was awarded because of a timing malfunction. Without that re-run he would not have been World Champion.

* The organisation was satisfactory, but not at the level of the Australian Pylon World Champs.

W.A. NATIONALS 1990

I made telephone calls to Chris Greenwood, Garry Davidson and Brian Steele to get reports about the Pylon events at the Bunbury Nationals held in January.

In general the Pylon events were not well attended, with many of the top performers missing. A contingent of pilots from Victoria accounted for 64% of the entrants. Victoria is very strong in Pylon and, with such a large percentage of the total field, they were able to take home all the trophies for pylon.

It was also noticeable that, because of plenty of racing, the Victorians had fewer problems. Most of the time they hit the starter and the engine fired. If you do not have this with your racer you will not win. You do not have very much time to get going, and with crank case pressure you cannot let the engine run for too long on the line; 30 seconds at the maximum; otherwise the engine will overheat and go off the pipe. As soon as this happens the engine will flood and cannot be restarted in time.

A few of the guys are experimenting with pipe pressure. With this you can let your engine run rich on the line and lean it out just prior to take-off. However, with this system tank position is critical; it must be as high as possible. Also, you need a tank almost twice the size of the one I am currently using. For example, I use a 110 ml

by John Hugan



Up from the Formula S ranks, Ken Prouse from Deniliquin had a very fast Little Toni with OS 40 FAI. Bold colours: red, white and black.

tank in FAI; Roger Langham uses a 225 ml one!

At the Nationals very fine weather was experienced throughout the meeting, with a temperature range from the mid 20s to the low 30s. The practice site was a football field, which was hardly the place from which to fly fast FAI models! The organisation of the Pylon events was excellent. Many of the other states should take note of how all helpers were on time and were willing and eager to do a good job.

The site was rather dry, with black sand. This was overcome by placing some nylon conveyer belts, about 5 metres wide and 17 metres long, across the field. There were about six of these. It was rather difficult to hit those mats every time when landing, and quite often models ended up in the sandy soil. The mats were a great idea and are ideal for dry field conditions. The MAAA should have some available for Nats purposes.

1/2A Pylon

There were seven entries in this event. The best time was Brian Steele with a 1:28. He flew a Carina design with unmodified ST 11 engine. One of the favourites, Eddie Rich, blew up his engine during the first race. Bill Hughes did the right thing and stepped on Brian's model. However, this did not put Brian out of the action; some quick Zapping and he was back in the air again to win the event comfortably.

RESULTS

1. B. Steele	649
2. J. McKissack	571
3. D. Axon	510

QM Pylon

Brian Steele won this event easily, with a best time of 1:16. he flew a Langham Midget Mustang with OS 21 engine and G22 prop. Garry Davidson provided some interest with his novel method of curing tank vibration and fuel foaming problems. He made his fuel line to the tank about 60 cm long and wrapped this around the outside of the fuselage. His idea was that the length would allow the foaming to settle down; and it worked!



Father and son combination, Damien and Robin Gray, at the Central Pylon Bonanza, July '89. Damien won with his Rossi 40 powered China Clipper built from a kit. Dad was caller this time.

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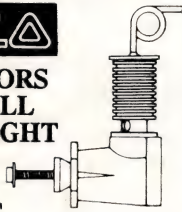
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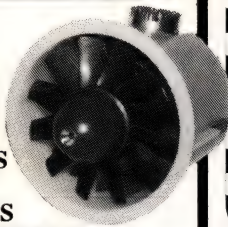
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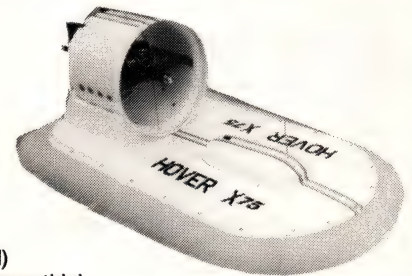
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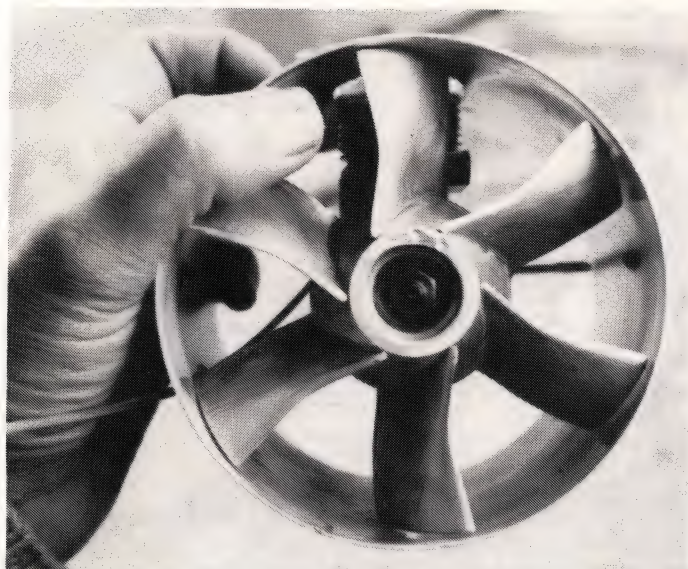


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Hand-made DF unit for Mirage 3-0 by Bill Burgess for K&B 40 series 67. Thrust was about 2 kg. Was started by a right angle drive electric starter via hatch in top of fuselage.

did not provide sufficient thrust. Improved fans were successful. All of Mike's fans were hand made, and all except one had blades carved from solid timber. The Mig 15 was powered by a metal bladed fan.

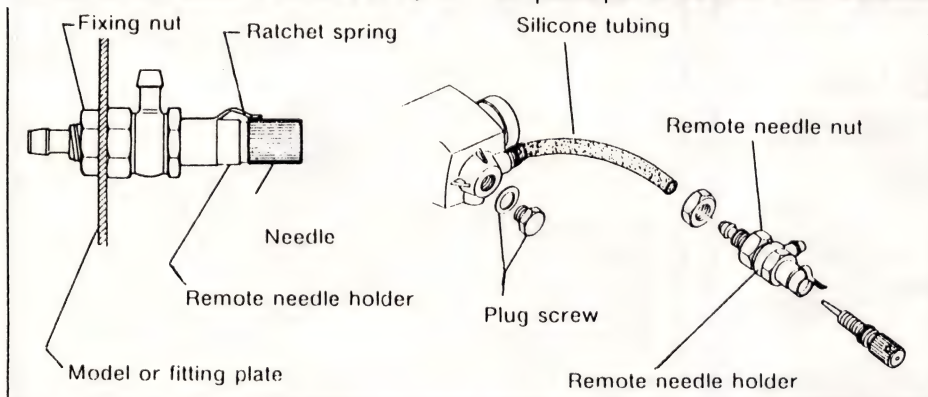
Ducted fans have come a long way since then, but I believe that we should still encourage modellers to try making their own. I am a bit concerned that current commercial units are getting bigger and bigger. If the F111 was made big enough to take a couple of Byron units, its size would be frightening. When I get around to completing the F111 I might have to build another Mirage for radio control. I still have all my old

drawings somewhere!"

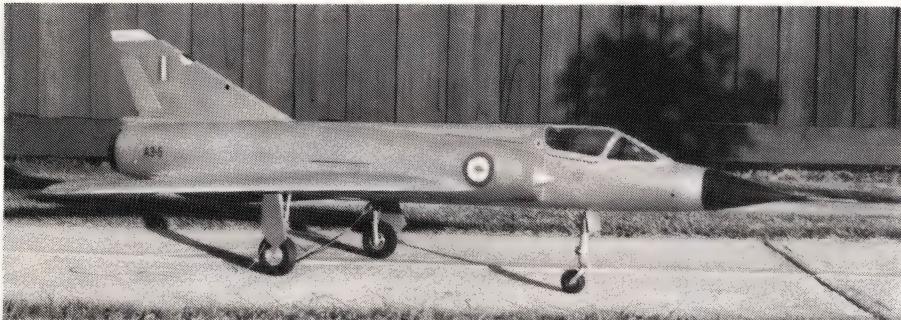
The Mirage is lovely, Bill. It would be nice to see those drawings; perhaps they could be made available to others, along with drawings of the F111. Mike Kulczyk is one of the pioneers in the ducted fan field, and his designs sparked me into making my own fans many years ago.

OS 91 VRDF

The latest engine on the ducted fan scene is the OS 91 VRDF. Claimed power output for this engine is around 4.6 BHP at 22,000 rpm. Fitted to a Dynamax or Byron fan, this engine should supply all the power we need. Also available as an optional part for the OS 91 VRDF is a remote



OS Remote Needle Valve enables needle valve adjustment to be made remote from the engine.



Bill Burgess' CL Mirage 3-0 weighed about 2 kg and flew on 70 foot (21.3 metre) lines at about 70 mph. That's 113 kph. Needed a hard surface for take-off. Retracting undercarriage was changed to fixed and saved 8 oz (226 gram) weight. All that in 1969!

Modelling is for fun: satisfaction with safety.



Bruce Mondientz with Sport Hawk. OS 77 modified Byron fan. Bold red, white and blue colour scheme. A different sort of rocket, Bruce? Hull pic.

needle valve assembly which allows placement of the needle valve external to the ducted fan unit in a convenient location under a hatch. This remote needle assembly may also be a convenient item to use with other engines. The OS part number is 28282000. Ask at your local hobby shop about availability.

FAN FLY FEAST

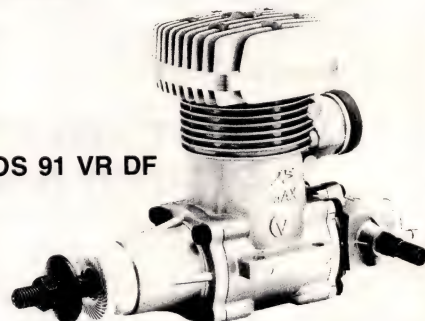
The Amberley, Queensland, ducted fan meeting will again be held over the Easter weekend. Contact Model Sports and Hobbies for details. **SEND IT!**

Ducted fans are the latest and greatest development in modelling, and new ideas are turning up all the time. This column is the means of sharing news about new models, new ideas and new materials, and also for asking questions if you need help. Photos are always welcome, and colour shots are acceptable. Remember to include details: sharing is half the fun. Send them to me via Box 30, Tullamarine, Vic., 3043.

JET JOCKS, LISTEN IN!

No entry in the armchair contest in No. 97 was correct! The stylised outlines were intended to challenge the aircraft observers among you but, apparently, no-one suspected any subterfuge! However, for genuine effort, prizes (coffee table books worth about \$30 a piece!), go to John Ellis in the NT, Geoffrey Martin in Victoria, Bill Pudney on South Oz and Jonathan Sim in En Ess UU. The silhouettes were: NA Fury (has a deeper fuselage than the Sabre); Douglas Skyray (curvier spine than the Skyhawk), DH Swallow (your free clue), Hawker Hunter, Thunderjet (not as waisted as the Thunder Streak), Hawker Kestrel (not the Harrier, which is lumpier), Supermarine Attacker and Saunders-Roe A1. You had better take notes in case there is another contest next X-mas!

OS 91 VR DF



FAN TAILS

By Russell Weir



Scratch-built F18 by Dave Beamsley. OS 77 and Dynamax fan combination should be able to cope with altitude density effect. Nice canopy there! Dave sent the photo from the Top End.

FAR FROM HOME

Recently I was fortunate to be able to spend a week in Japan, and visited some model shops. This was no mean feat, as all advertisements and directions are written in Japanese! For someone from the wide open spaces of Australia, Japan seems to be wall to wall development and people. Flying space must be at a premium, and I guess, for this reason, electric power seems to be the in thing. I have not really considered electric power for model aircraft, but after seeing the products available and the direction in which development is taking place, I believe that there will be a very big future for this type of power. There is even a Japanese magazine devoted entirely to electric motor powered models. It is of excellent quality, but not very useful to those who are illiterate in Japanese!

The hobby shops that I visited were quite small, but jam-packed with goodies. Unfortunately for me, due to the low value of the Australian dollar, most kits and engines would cost more to purchase there than back home. The hobby shops stocked mostly RC cars, helicopters and electric powered aircraft, all appropriate where noise and space restrictions apply.

It appears that some serious development is

being done with electric ducted fan aircraft. Electric motor powered ducted fans have been tried before, with only limited success, so it will be interesting to see if these new experiments provide us with an alternative power source. There appears to be very little ducted fan activity in Japan, due to space and noise restrictions, so any successful electric powered fans are sure to come from that country.

MODELLERS' PROJECTS

Dave Beamsley from Darwin sent in photos of his latest creation, an all wood scratch-built F18. To make it go he has installed a Dynamax fan with OS 77. Eight servos are required for control functions, so it is obvious that this is a major project.

Bill Burgess from Clifton Beach in Queensland sent in a set of really interesting photos of his ducted fan exploits over the last 20 years. I will let Bill explain:

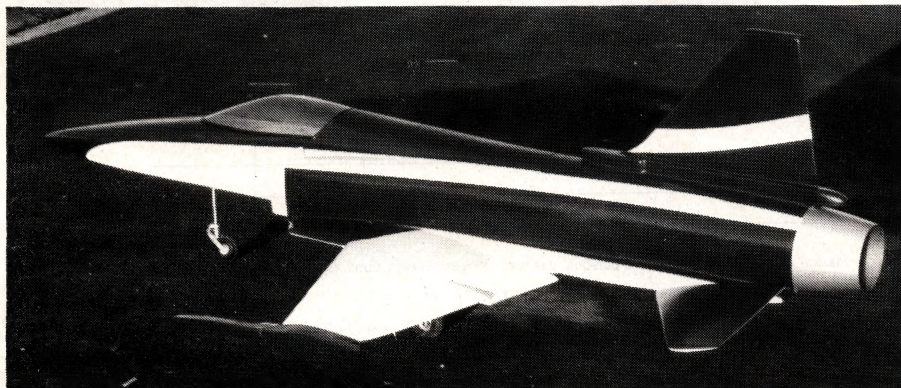
"A few photos may be of interest. One is of the F111, a few months ago; progress is slow. The other models are a bit older: the Mirage 3-O first flew in October 1969 in Las Vegas, USA, where I was based on exchange with the USAF. Mike Kulczyk lived directly across the road from me and got me going in ducted fans. The Mirage was



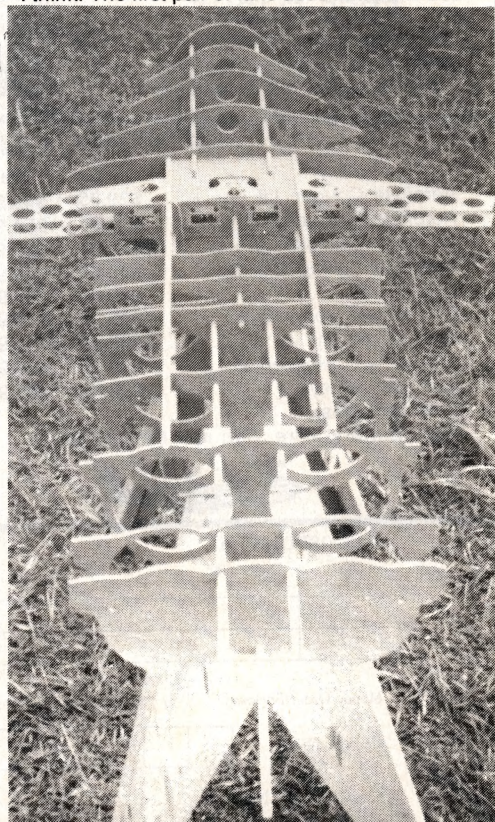
David Law with Ken Mollison's F15 at the Leeton Fly-In. Twin K&B 7.5 cc engines give David plenty to fly the model. Photo by Jon Hull.

powered by a K&B 40 series 67, slightly warmed up by myself, and driving a home-made metal bladed fan. I still have the power unit!

The other photo show a collection of Mike's fan models at that time. They are all control line. (Photo didn't reproduce well enough.) The Mig 15 had a 2.5 cc engine; the F100 an Enya 29 and the Me 262 was powered by two 3.5 cc engines, I think. The first pair of fans used in the Me 262



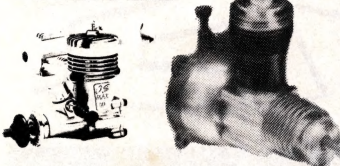
Tiger Shark by Trim Air. Well-proven design by Tony Roessen; now available as a kit. For 12 cc engines and Dynamax fan.



F111 structure by Bill Burgess who lives near the home of the big ones. Swing wing mechanism is functional! Who is your design engineer, Bill?

MOTORS

CONTROL LINE



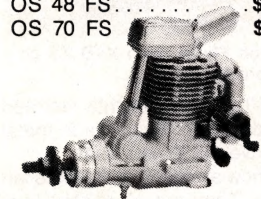
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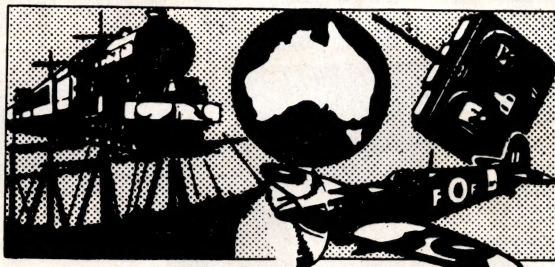
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PIC (1/2 oz)

Red, Pink Yellow; all.....\$4.99

HOT STUFF

Standard Cyano, 1/2 oz.....\$4.99

UFO (new); no fog, 1 oz.....\$11.99

DEVCON 5 Minute Epoxy.....\$5.50

RCS EPOXY

5 Minute.....\$12.99

15 Minute.....\$12.99

30 Minute.....\$12.50

AEROFLYTE

Std Balsa Cement C23.....\$1.95

BOOKS

Build & Fly R/C Gliders;

by J.E. Schroder.....\$7.95

Giant Scale RC Aircraft;

by Bob Beckman.....\$18.95

Basics of R/C Modeling.....\$14.95

Electric Model Aircraft.....\$15.95

Ducted Fan RC Aircraft.....\$12.95

Learning to Fly RC Aircraft.....\$15.95

MODEL ROCKETS

ESTES

(Order from Perth or Melbourne only)

Starter Kits

Screaming Eagle Set...\$46.95



Alpha 3 Set.....\$55.95

Magnum Set ('B' Engines).....\$79.95

Rocket Engines (packets of 3)

'A' Eng A8-3, A8-5.....\$7.99



'B' Eng B4-2, B4-4, B4-6,

B6-2, B6-4.....\$8.99

'C' Eng C6-3, C6-5, C6-7.....\$9.95



Also a full range of accessories:
launching gear, parachutes,
igniters, wadding, etc.

ACCESSORIES

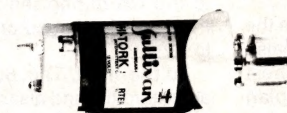


Flight Box (TT).....\$35.00



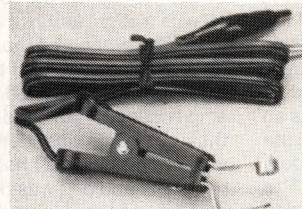
Power Panel.....\$36.95

Hercules Starter.....\$49.95



Sullivan 601 Starter (USA).....\$57.95

Lock-on Leads.....\$6.99



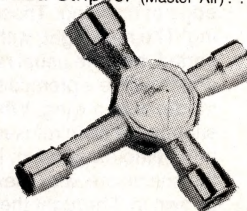
Peg Type Leads.....\$4.50

Filler Bottle.....\$3.50

Fuel Pump 6V or 12 Volt.....\$27.95

Balsa Plane (Master Air).....\$10.99

Balsa Stripper (Master Air).....\$10.99



Four Way Wrench.....\$3.95

Retracts Set (3) Trike.....\$69.95

GLOW PLUGS

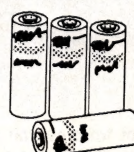


10 x OS Number 8.....\$49.99

10 x Taipan Yellow or Red.....\$32.00

NICADS

AA Saft 500mAh.....\$2.99



KITS

TRAINERS



Pilot QB 15H.....\$75.95

Pilot QB 25H.....\$79.95



Aeroflyte Telstar.....\$79.95

Aeroflyte Hustler.....\$89.99

Cosmo 25.....\$69.95



Cosmo 40.....\$99.95

SIG Kadet Junior.....\$109.95

SIG Kadet Mk2.....\$138.95

SPORT/SEMI SCALE

Aeroflyte Gemini 40/45.....\$139.95



Pilot P51, ME109,

Spitfire, FW 190.....\$199.95

Pilot Cessna 152, 177.....\$169.95

Pilot Tiger Moth (25).....\$210.00

Pilot Tiger Moth (40/45).....\$299.95

Pilot 1/4 Tiger Moth (120 FS).....\$629.00



SIG Astro Hog.....\$207.00

SIG Kavalier.....\$198.00

SIG Colt.....\$89.95

SIG Piper J3 Cub (1/4).....\$393.00

SIG Piper J3 Cub (1/6).....\$199.95

SIG P51 Mustang (WW2).....\$239.95

SIG Smith Mini Plane.....\$194.00

SIG Mustang 450 Pylon.....\$164.00

COVERING

(All Colours)

Solarfilm.....\$7.89

Solarspan.....\$10.50

Dope, 1 litre.....\$8.99



SCORPIO FIESTA 45

KIT REVIEW

Review kit supplied by ABC Models. Available in all states.

Reversing the usual sequence of kit reviews, let me tell you that the Fiesta 45 that I have just built and flown is finished in pink and grey! Much thought goes into colour schemes. Some builders want visibility at altitude, some need quick reference as to which side is up, particularly at low altitude, while I just like appropriate colour combinations. So, why pink and grey? Well, it seemed perfectly logical to me to finish a model named Fiesta in Gala colours. I know you are ahead of me now! For those who are not, Galahs are pink and grey and fly! The surprise was that the model is visible at all altitudes and its place in space is quickly identifiable when you most need it; down low. A little trim applied in silver also helps. While you may not be familiar with a Silver Galah, there is a well known Silver Budgie to lend credibility to the trim.

What constitutes a modern **ARF kit**? With the Fiesta 45 you receive a partially completed balsa and ply fuselage, finished, built-up wings, sheet balsa covered, and sheet tail feathers. The plan is easy to follow and, when read in conjunction with the very detailed instruction booklet, in four languages, leaves little room for error. For the more skilled, might I suggest tearing out all the pages except, say, those in Spanish, and working from there? Sort of a handicap, what! I kept with the English words, as I am my own handicap.

As for the **building**, it is a breeze, as befits an ARF. Epoxy the wings together, bandage the centre section with the fibreglass tape provided, add the wing tips and sand all smooth. The fuselage is, if anything, easier. Add the engine mounts, cowl pieces and servo tray, finish the fuel tank hatch and then sand everything nice and round as shown in the cross sections. Add the nose gear, throttle servo link and wire inside plastic tube rudder-nose wheel and elevator pushrods. Sand again, fuel-proof the engine and tank bays and go out and buy some pink and grey covering! Zap the fin and stabiliser in place and cover the fuselage, elevator and rudder. If you don't like pink and grey you are on your own. Pick appropriate colours. (It would be nice to be able to say "Choose a gay colour scheme".)

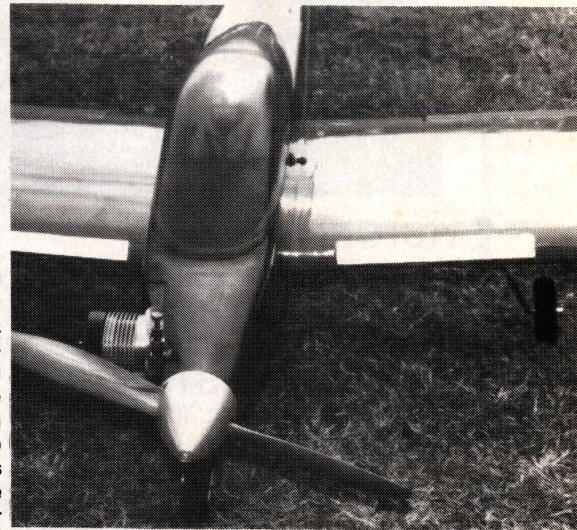
A feature of the Fiesta 45 is the incorporation into the design of anti-stall sections which are zapped onto the leading edge of the wing. A positioning template is provided to render this

operation accurate. (More about this in the 'How does it Fly' department.) The wings are now covered, after removing the sheeting and building a box for the aileron servo, and all the control surfaces covered and hinged. The beautiful tinted canopy is now trimmed and fitted using Poly Zap. We now have Galahs, Budgies and Pollys.

The only decision now is what engine to use to power this pretty bird. As I was out of 45s, I decided on an OS Blackhead 60. The rationale is that it is always possible to throttle down a more powerful engine, whereas it is nigh impossible to push the throttle through the stop when using less than sufficient power. So, in went the .60, with the help of a little shoe-horning. The CG was a tad forward and the model weighed 5 lb 4 oz dripping wet. Due to a series of cavortings to the US during the year, the building of the Fiesta had dragged on a little and I was eager to fly it.

To the field. The .60 started up and ran well at full throttle, and also at idle after a little fiddling. I taxied it out, turned into the wind and opened the throttle. The Fiesta 60, to give it its new name, tracked right down the centre of the strip and flew off with a slight touch of elevator. I flew it around for a little while and then thought that I should try a landing pass, so I brought it round on low throttle. When I opened up a little to overly the strip I noticed (I am good at noticing the obvious) that the engine was silent and that the propeller was not propelling. I had a long way to stretch the glide, and as I was doing so thoughts of my old Diablo dying in a similar situation came flooding back.

The Fiesta just kept on coming right on in, low and slow, and at no time even looked like dropping a wing. It was then that I remembered those anti-stall devices that I had stuck on the leading edge of the wing. Those little things were working! The next flight, with the engine a little more sorted, had the usual repertoire of hot-dogging, and this time a premeditated attempt to make the model drop a wing. While it could be stalled, or snapped, it plain refused to get untidy flying slow and being dragged in. Next flight was similar to the one before, with a few more degrees of daring thrown in. I brought the Fiesta down lowish and inverted, and started climbing out, still inverted, when the engine went strangely quiet. The model



Anti-stall strips on inboard leading edges provide extra performance. Note wide track undercarriage. Blackhead OS is a 60, although kit is ostensibly designed for 40 to 45s.

was about twenty feet off the grass and climbing slowly. As soon as it appeared to have enough altitude to recover, I pulled full up and it bunted inverted, clearing the ground by some six feet. I breathed again, and as I had run out of options, I landed. At no time did the model get out of shape, and was controllable all the way through. Hurray for anti-stall devices!

The Fiesta 45/60 is quite an aeroplane. It is well engineered, simple and quick to build, looks quite attractive and flies brilliantly. The model is kitted by the Italian company, Scorpio s.r.l., and is available from ABC Hobbies. Come to think of it, the Fiesta would look rather nice in Italian colours of red, white and green. Say, does that remind you of a Parakeet?

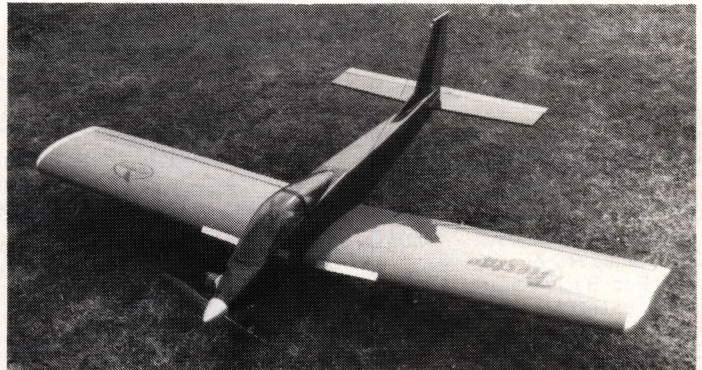
C.B.

Vital statistics of the Fiesta 45/60

Wingspan:	1560 mm (62½ inch)
Length:	1160 mm (46½ inch)
Total Area:	48.88 sq dm (609 sq in)
Total Weight:	2400 to 3000 gm (82 to 103 oz)
Wing Loading:	50 to 60 g per sq dm (18 to 23 oz per sq ft)



Rectangular wings and slab tail surfaces do not detract from overall good looks. There is performance to match, for above average pilots.



This Fiesta is pretty in pink and dark grey, as shown on the colour page. Fuselage lines are simple and sleek.

Modelling is for fun: satisfaction with safety.